Monitoring and Evaluation of Spatially Managed Areas

Deliverable 3.6

Zoning plan of case studies:

Evaluation of spatial management options for the case studies

Annex 9

Second Framework Run

The Strait of Sicily

Due date of deliverable D3.6: month 35
Actual submission date: month 35

WP3 Coordinators: Dr. Jan Vanaverbeke and Prof. Dr. Magda Vincx

Ghent University, Biology Department, Marine Biology Research Group

(Partner 4, UGent, Belgium)

Grant Agreement number:	226661
Project acronym:	MESMA
Project title:	Monitoring and Evaluation of Spatially Managed Areas
Funding Scheme:	Collaborative project
Project coordination:	IMARES, IJmuiden, the Netherlands
Project website:	www.mesma.org

Contributors:

Dr. Jan Vanaverbeke, Prof. Dr. Magda Vincx, Ghent University
(Partner 4, UGent, Belgium)

Dr. Christine Röckmann, Dr. Robbert Jak, David Goldsborough, Jan Tjalling van der Wal
Institute for Marine Resources and Ecosystem Studies
(Partner 1, IMARES, The Netherlands)

Louise Liberknecht, Dr. Peter Jones, Dr. Wanfei Qiu
University College London
(Partner 2, UCL, Great Britain)

Dr. Tomas Vega Fernandez, Dr. Carlo Pipitone, Dr. Fabio Badalamenti, Dr.Giovanni D'Anna, Dr. Fabio Fiorentino, Dr. Germana Garofalo, Dr. Michele Gristina
Consiglio Nazionale delle Ricerche
(Partner 9, CNR-IAMC, Italy)

Thomas Kirk Sørensen, Lotte Kindt-Larsen
Technical University of Denmark, National Institute of Aquatic Resources
(Partner 12, DTU AQUA, Denmark)

Dr. Ingrid Kröncke, Sandra Vöge
Senckenberg Gesellschaft für Naturforschung
(Partner 3, Senckenberg, Deutschland)

MSc. Marie Louise Pace, Dr. Leyla Knittweis
Ministry for Resources and Rural Affairs
(Partner 11, MRRA, Malta)

Dr. Vassiliki Vassilopoulou, Dr. Panayotis Panagiotidis, Yiannis Issaris, Dr. Maria Salomidi, Athina Kokkali,
Hellenic Center for Marine Research
(Partner 5, HCMR, Greece)

Dr. Lene Buhl-Mortensen, Dr. Pål Buhl-Mortensen, Dr. Erik Olsen, Sjur Lid Ringheim, Ingolf Røttingen, Dr. Alf Håkon Hoel, Dr.Bjørn Einar Grøsvik, Dr.Genoveva Gonzalez-Mirelis, Eva Marie Skulstad
Havforskningsinstituttet

Dr. Julia Carlström, MSc. Nicklas Wijkmark
AquaBiota Water Research, Sweden
(Partner 17, NIVA, Norway)

Dr. Cor Schipper, Drs. Patricia Schouten-de Groot
Stichting Deltares
(Partner 16, Deltares, The Netherlands)

Dr. Valentina Todorova, Dr. Valentina Doncheva, Marina Panayotova
Institute of Oceanology/ IO-BAS

Dr. Ibon Galparsoro, MsC. Marta Pascual, MsC. Martín Aranda, Dr. Ángel Borja, Dr. Iratxe Mentxaka, Dr. María Calvo, Dr. Guillem Chust Fundacion AZTI/AZTI Fundazioa
(Partner 10, Tecnalia AZTI, Spain)
)

Dr. Kris Hostens, MSc. Ellen Peccue
Institute for Agricultral and Fisheries Research – Vlaams Gewest
(Partner 19, VlaGew, Belgium)

Dr. Kate Johnson, Dr. Sandy Kerr
Herriot-Watt University
(Partner 14, HWU, Great Britain)

MSc. Joanna Piwowarczyk, Dr. Jan Marcin Weslawski
The institute of Oceanology of the Polish Academy of Sciences
(Partner 22, IO-PAN, Poland)

TABLE OF CONTENTS

INTRODUCTION

This deliverable D2.2 comprises a manual containing the protocol for the application of the generic framework to the MESMA case studies. The generic framework (deliverable D2.1) is the central document for the subsequent work packages of MESMA. It provides a best practice guide for monitoring and evaluation of Spatially Managed Areas (SMA) in seven distinctive and clearly outlined steps which comprise 1) setting the context, 2) collation of existing information and mapping, 3) setting of targets, 4) risk analysis and state assessment, 5) assessment of findings against operational objectives, 6) evaluation of the effectiveness of management measures and 7) adaptation of the current management regime based on the outcome of the assessments (for details see D2.1).

Although the framework has been developed as a generic tool for use by a range of people involved in evaluating SMAs, the first version of the manual was specifically tailored (in certain areas) for use by the case studies (WP3 of MESMA). It was designed to be an aid to the case studies applying the framework. Thus, feedback on the performance of the framework and manual is guiding the production of a revised framework and manual (D2.3) to be delivered in November 2012. The revised versions will be made available to the wider scientific community and management bodies. This document is the third version of the original document D2.2.

As outlined in more detail in D2.1, we have identified several links between the WP2 framework on the one hand and a structured governance analysis (WP6) on the other. These links are indicated in the respective framework steps. The MESMA generic framework and manual does not accommodate for a comprehensivec governance analysis. Therefore the MESMA case study research has two streams – the MESMA framework and the governance research analysis. Governance issues in all MESMA case studies will be analysed through the **WP6 Governance Analytical Structure**. Further guidance on governance research has been developed and is available in a separate document entitled 'Guidelines for MESMA WP6 Governance Research'. The WP6 governance research essentially aims to address the following questions:

1) What are the governance approaches and incentives being adopted in a given existing initiative with spatial elements, and how effective are the incentives and governance approaches in that particular context in achieving a particular priority objective?
2) What are the potential incentives and governance approaches that could be implemented to improve effectiveness in achieving the specific objective of an existing initiative and addressing related conflicts?
3) How do wider issues, such as top-down/bottom-up balance, inter-sectoral integration and power, cross-border issues, justice and different levels of knowledge, affect the effectiveness of existing initiatives?

This 'two stream' approach will provide a clear way forward for combining the MESMA framework and governance research to the case studies in an integrated and coherent manner. As a result, in depth governance analysis covered by the governance work package is outlined briefly in the introduction of each framework step together with specific actions which will be largely carried out under the governance research. Further details on the WP6 governance analysis and on how the two streams of work will be linked from a WP6 governance perspective can be found in the document 'Guidelines for MESMA WP6 Governance Research', and Appendix 1 of this document shows a visualisation of the linkages between the two streams of work. **It should be noted that in order to be able to link and integrate WP2 and WP6 research, both of the following conditions should be met:**

1) **Both WP2 and WP6 research are about analysing an existing initiative. Such an initiative may be an integrated marine spatial plan or part of the integrated plan; or if there is no integrated marine spatial plan in place, an existing initiative with spatial elements (e.g. sectoral**

management plan with spatial restrictions) which may be linked or offer valuable lessons to the future development of an integrated marine spatial plan.

2) **WP2 and WP6 research should focus on the same priority objective for at least one run of the WP2 framework.**

The practical implementation of the framework is also linked to specific tools which will be identified and developed in WP4 and the data handling standards specified in WP5. A revised version of the manual should then interlink the actions underneath each framework step with a set of practical tools comprising technical and conceptual tools.

MANUAL USER GUIDE

It is the purpose of this manual to guide the user through the application of the generic framework within a marine area. If a spatial management plan exists for that area, the framework can help to monitor and evaluate the performance of the plan. If there is no spatial management plan in place, the framework can help to identify issues to be taken into account as part of the planning process (figure 2). The framework is part of an integrated toolbox, comprising technical tools, metadata and a structured approach to analysing governance, which guide the user through evaluation of an existing or proposed management plan.

The MESMA framework comprises a series of steps that can be completed to a greater or lesser extent and used to present the outcomes of the assessment. The manual aims to provide clear and user friendly instructions on how to complete each step of the framework, along with specific instructions on when to proceed to the next step. It includes specific actions that should be undertaken for successful completion of the evaluation.

Below is some guidance for using the manual:

1. Under most actions there are tables which will help the user to complete each action, summarise results and collate information for use in subsequent actions. Tables can be amended to reflect the needs of the user. Although it is acknowledged that information is not always available, completed tables will provide the best results; tables should be populated with as much information as possible.
2. Where an action can not be completed due to lack of information or expertise, this should be noted and fed into step 7 where recommendations for future adaptations can be made.
3. In some steps, information collected for use (and tabulated) at an earlier stage in the framework may be required for use in subsequent steps.
4. All background information used to compile the manual has been discussed and referenced in the parallel deliverable D2.1 Generic Framework for Monitoring and Evaluation of Spatially Managed Areas (SMAs). Therefore document D2.1 should be referred to for background information.
5. Throughout the manual, 'Governance Analytical Structure' refers to the WP6 governance framework described in the guidance document entitled 'Guidelines for MESMA WP6 Goverance Research'.
6. The framework is a tool that can be used iteratively to test different combinations of objectives.
7. To begin the assessment, establish the scope of your study. This will help you identify what you wish to achieve from applying the MESMA framework to your case study i.e. identify the overarching goal or desired outcome.
8. Final tables or maps for each step should be retained, as they may be used again, particularly in step 7. They should also be retained for comparison with the results of subsequent iterations.
9. There are several steps in the manual where there will be a level of uncertainty in analysing results or making decisions. Where present, uncertainty should be reported on. A fully qualitative or quantitive method for reporting uncertainty is under development and will be included in the final updated manual D2.3.
10. WP5 will guide case studies on cataloguing data using a metadata format that is compliant with both ISO core (19115, and 19139) and INSPIRE core. A bespoke web-based tool will be used to create, share and view metadata records (GeoNetworks). For further details on this please consult D5.2.
11. All mapping exercises should result in final maps using the coordinate system WGS84 and Mercator projection format. For further details on this please consult D5.2.

12. A definition of key terms used in the manual can be found in the Glossary at the back of this manual. This is a condensed list of key terms taken from the glossary on the sharepoint in *WP7 Dissemination > Glossary*.
13. Examples of nine different case studies that have applied the framework can be found in D3.3.
14. Whilst the MESMA framework is being applied, case studies should provide WP4 with suggestions and ideas for tools to support the application of the framework and WP5 with precise information about the GIS data collected and used to produce maps, known as 'metadata'.
15. Please note that although the framework can guide you through the evaluation of an existing management plan, it can also be used for scoping of issues or as a checklist. Thus, it should be used as guidance and is not necessarily prescriptive.

THE APPLICATION OF THE GENERIC FRAMEWORK (GENERAL)

The rationale of the developed framework is outlined in D2.1. It is essential that this document is used in conjunction with this manual. It provides further details as well as key references for the information drafted in this deliverable. The preparatory work and the sequence of steps and related tasks are described in detail in this deliverable.

Before starting with the actual assessment, each case study should describe the way in which the MESMA framework will be applied. For instance, in some cases the single steps are processed, while in other cases the framework will be used to evaluate the process of implementing current spatial management plans. Thus each case study should outline how the framework is going to be used and what the expected outcomes are. Each step gives clear guidance on suggested methods and tools to be used to conduct the respective analysis under the single steps.

In Figure 1, the practical implementation of each framework step is described, taking into account data availability and the related variation of activities under each task. Underneath each step a number of actions are defined based on the results of the WP2 workshops. Guidance has been provided to reflect the data available; actions are described with clear guidance on the methods and tools to be used where a conclusion has to be drawn or a map has to be created from GIS based information, expert knowledge and/or qualitative information.

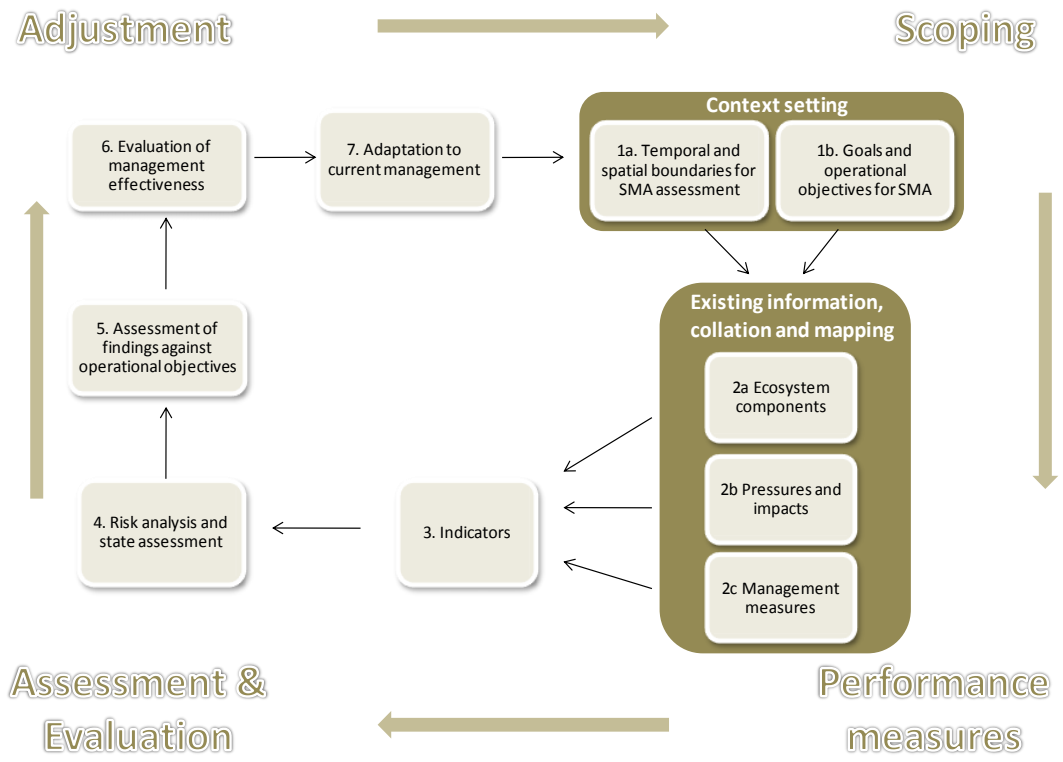


Figure 1. Proposed MESMA framework outlined in detail in D2.1.

WHAT CAN THE MESMA FRAMEWORK DELIVER FOR THE CASE STUDIES?

With the help of a few standardised questions, each case study can assess how the MESMA framework is used for the particular case and what the expected outcomes are:

i) Give a brief (150 words) description of the case study, highlighting the main issues regarding its spatial management.

The Strait of Sicily is defined as the part of the Central Mediterranean Sea comprised between the international waters off the African coast, the southern coast of Sicily and the waters surrounding the Maltese archipelago. It roughly coincides with the FAO GSAs 15 and 16, plus a tiny part of the GSAs 12 (northern tip of the Egadi Islands) and 13 (Pantelleria Island). The area is characterized by high seas with sprinkle small islands, unique oceanographic features, large habitat heterogeneity, huge (beta)diversity, exceptionally high productivity, and a massive cultural heritage. The entire area holds the homelands of very different human populations that heavily exploit a vast array of marine resources from ancient times. The Strait of Sicily inherits a complex composite of conflicts among different uses of the marine realm at several spatial and temporal scales, while lacks an unified policy among nations and sectors.

ii) Describe the relative position of the case study within the scheme in Figure 2 (for a detailed description see D2.1).

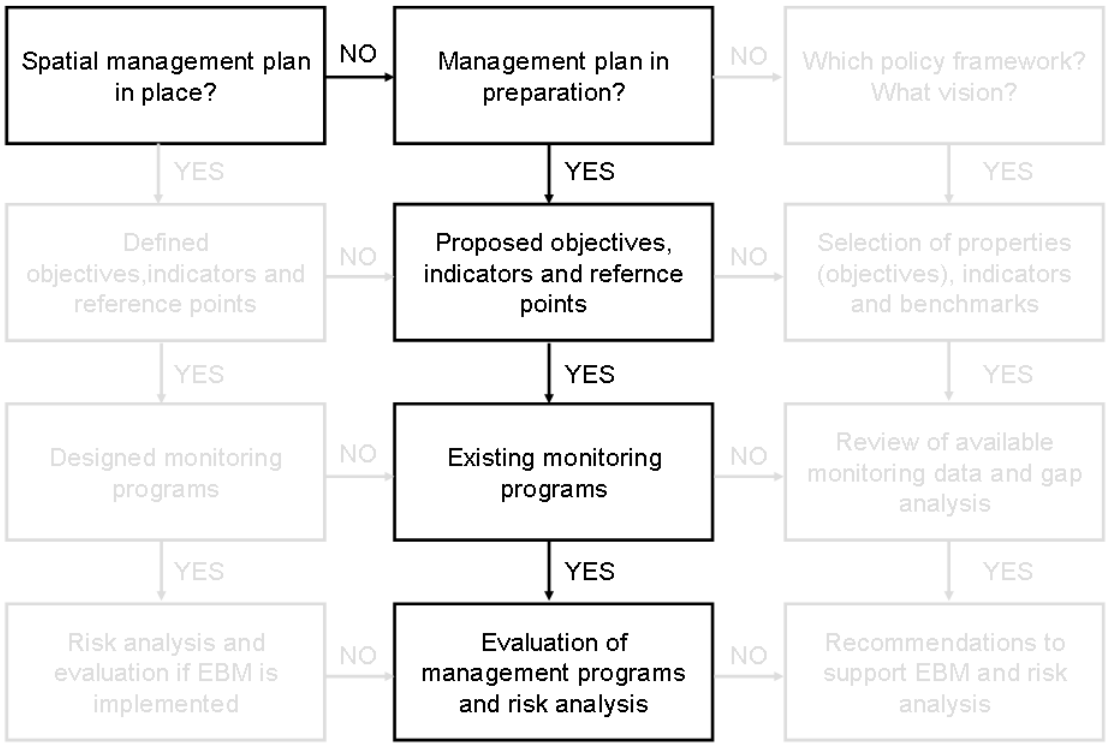


Figure 2a. Conceptual flow diagram which relates the maturity of a the spatial management of fisheries in the Strait of Sicily, together with the available data and expected assessment outcomes.

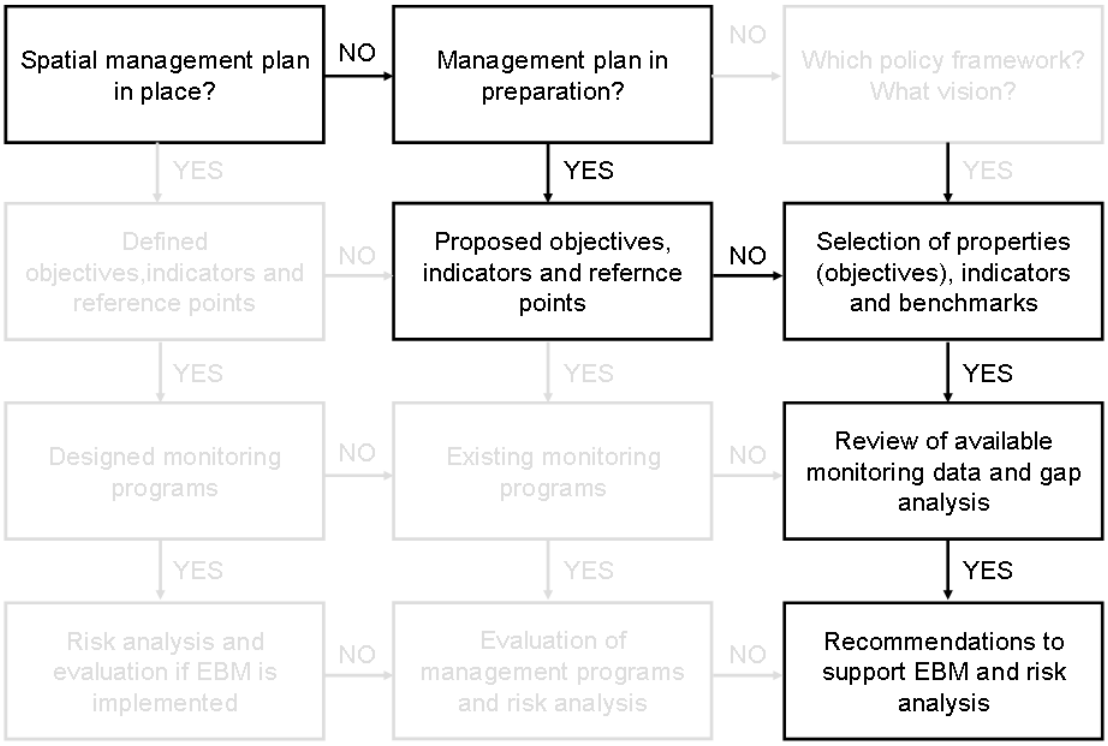


Figure 3b. Conceptual flow diagram which relates the maturity of a the spatial management of nature conservation in the Strait of Sicily, together with the available data and expected assessment outcomes.

iii) How will the MESMA framework be used for the case study?

- The framework will allow to get a general view of the present activities, stakeholders and governance in the case study.
- Its outcomes will help in the decision process for establishing the Marine Strategy Framework Directive.
- Will be useful when distributed among stakeholders in order to generate new links between them and stimulate a management plan.

iv) What are the expected outcomes of the application of the MESMA framework?

- Better communication, cooperation and also better management of data between different government entities as these would have been consulted during the implementation of the framework.
- Identification of all the existing measurements already in place in the Case study area.
- Identification of all the conflicts between present activities and measurements and also identification of conflicts between different stakeholders.
- The results obtained from this framework will contribute to the design of the marine spatial plan.
- Convey specific recommendations from the local idiosyncrasy to policy makers.

STEP BY STEP GUIDANCE ON THE APPLICATION OF THE GENERIC FRAMEWORK

Step 1 Context Setting

The first question in step 1 is designed to allow the user some flexibility in collation of information depending on whether or not they are evaluating a single integrated marine spatial management plan. If a single management plan is being evaluated, the user should complete actions 1a.5 and 1b.8 to collate the information on the boundary and objectives of the plan (assuming that this information is readily available).

If there is not one single spatial management plan under evaluation then the user should undertake step 1a (actions 1a.1 to 1a.4) to define the boundary and step 1b (actions 1b.1 to 1b.7) to define the operational objectives. Steps 1a and 1b should be carried out together. Both steps use different pieces of information (from existing sources) to complete subsequent actions, in order to set the context for evaluation throughout the rest of the manual.

It is worth noting that this section links to section 1.3 in the Governance Analytical Structure, accepting that from a governance perspective, the boundaries have already been defined by the existing initiative upon which the governance analysis is focused.

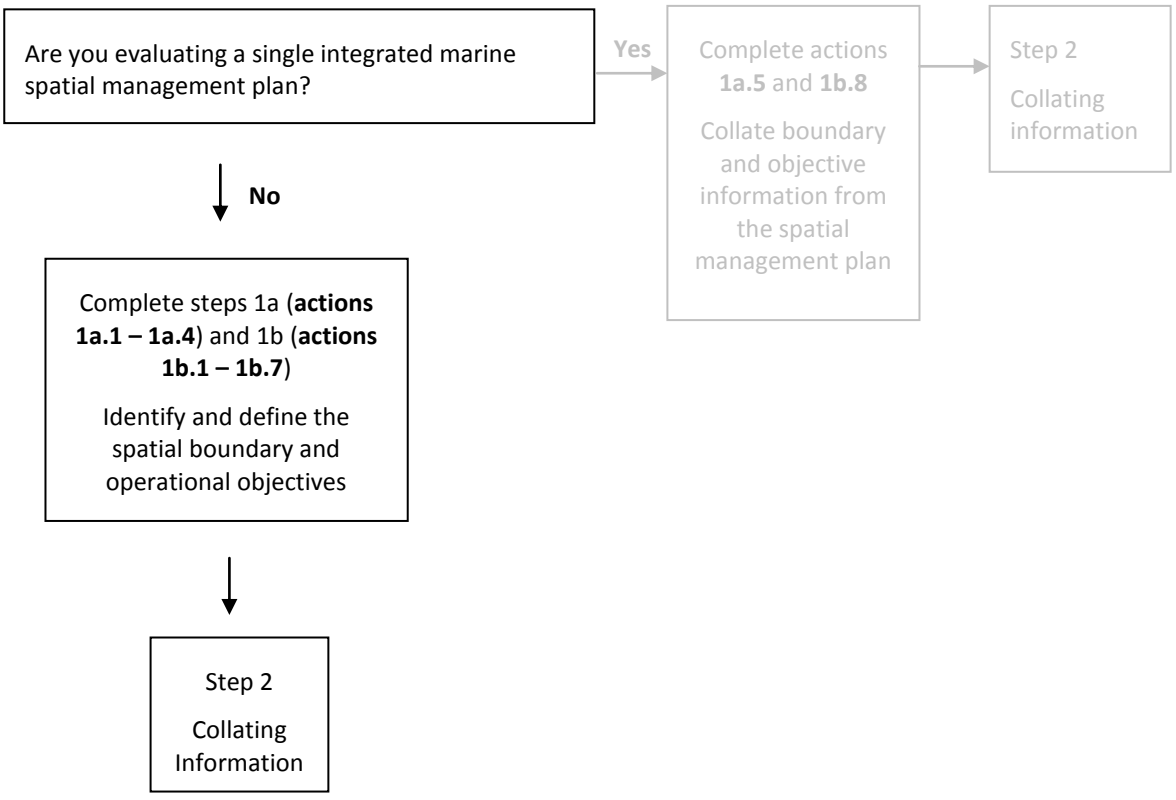


Figure 1.1. Work flow for step 1.

Consult the following bullet points for direction to the appropriate step:

- Single integrated marine spatial management plan available – go to action 1a.5.
- Single integrated marine spatial management plan not available – go to action 1a.1.
- One or more existing management initiatives (with spatial elements) e.g. sectoral management plans – go to step 1a.1.

Step 1a Set spatial and temporal boundaries for SMA assessment

Step 1a should be carried out in conjunction with step 1b; together they should set the context for the physical area involved as well as the overarching aims of the plans for the SMA. Having decided which objective will be the focus of the MESMA framework evaluation, there may be several different spatial boundaries that are specified in the relevant legal and policy documents; these should be the boundaries that are used in the MESMA case study research, recognising that these boundaries may themselves be a focus for disputes. In this way, the case study research is based on actual, real policy initiatives and related conflicts, rather than hypothetical scenarios. Conflicting objectives such as conservation objectives and other local and sectoral objectives will also be considered through the governance research analyses, particularly in section 1.3 of the Governance Analytical Structure; although from a Governance perspective, the boundaries will have already been defined by the existing initiative that WP6 is focused on.

Step 1a begins by identifying and mapping existing management plans, sectors and activities which have a spatial boundary and the relevant institutional landscape. This information is then used to finalise the spatial boundaries using a flow diagram which prioritises boundaries to ensure the best information available is used to inform decisions. For many of the MESMA case studies where the boundaries are already defined, this step can be used to evaluate the chosen boundaries and to suggest future changes. The output from step 1a is a finalised spatial boundary which, alongside the output from step 1b (which is a summarized list of policy goals and objectives relevant to the SMA), will feed into step 2 to ensure that all information collated is at the relevant spatial scales.

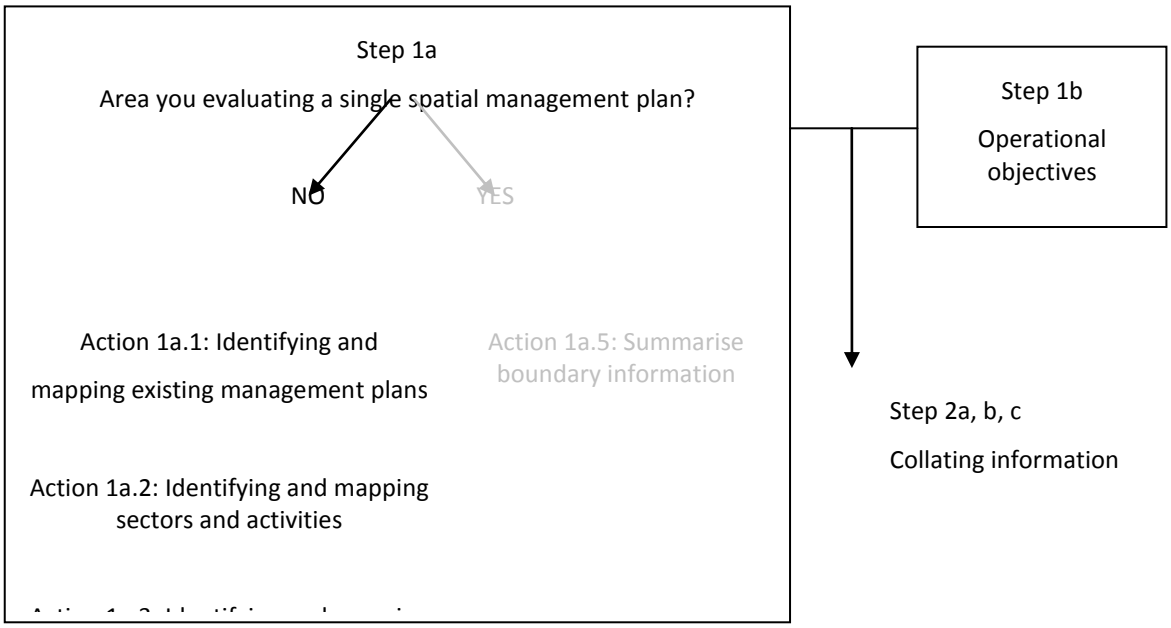
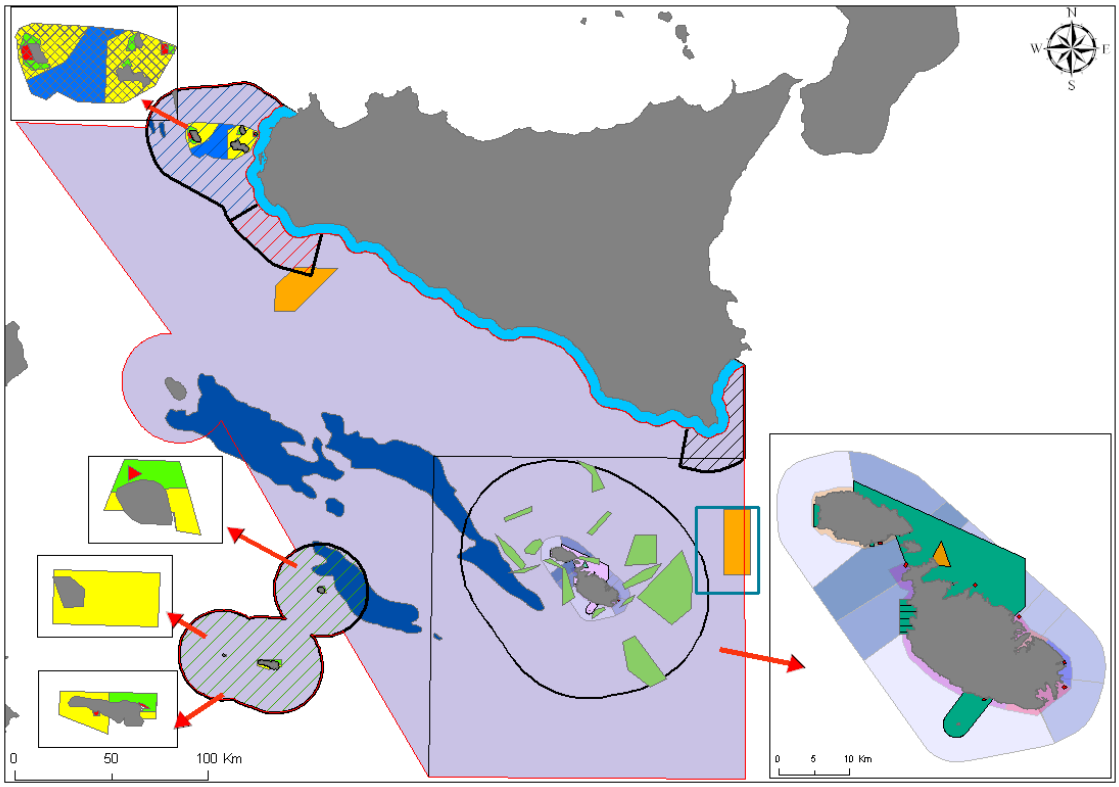


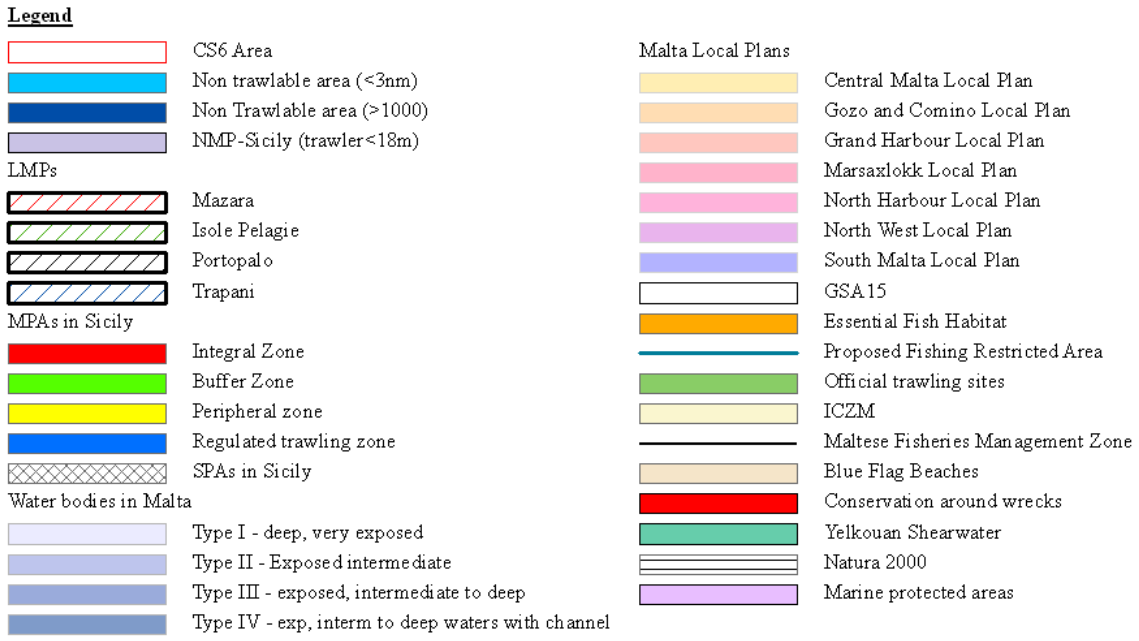
Figure 1a. Work flow for step 1a.

Action 1a.1 Identifying and mapping existing management plans

Identify which management plans or initiatives are applicable to the SMA. Check the management plans or initiatives for their proposed spatial and temporal limits.

The spatial scale of all management plans should be mapped using GIS software. This may be illustrated with a basic polygon of the area under management or may be a more complex map of the separately managed areas. The metadata, i.e. precise information about the GIS data used to produce the maps, should be included in the MESMA Geonetwork metadata catalogue.




Legend
CS6 Area
Non trawlable area (<3nm)
Non Trawlable area (>1000)
NMP-Sicily (trawler<18m)
LMPs
Mazara
Isole Pelagie
Portopalo
Trapani
MPAs in Sicily
Integral Zone
Buffer Zone
Peripheral zone
Regulated trawling zone
SPAs in Sicily
Water bodies in Malta
Type I - deep, very exposed
Type II - Exposed intermediate
Type III - exposed, intermediate to deep
Type IV - exp, interm to deep waters with channel
Malta Local Plans
Central Malta Local Plan
Gozo and Comino Local Plan
Grand Harbour Local Plan
Marsaxlokk Local Plan
North Harbour Local Plan
North West Local Plan
South Malta Local Plan
GSA15
Essential Fish Habitat
Proposed Fishing Restricted Area
Official trawling sites
ICZM
Maltese Fisheries Management Zone
Blue Flag Beaches
Conservation around wrecks
Yelkouan Shearwater
Natura 2000
Marine protected areas

Complete table 1a.1. Where there are no management plans in place move to action 1a.2.

Table 1a.1 Spatial and temporal boundaries of the management plans and initiatives in the Strait of Sicily

Operational level	Plan name	Date of implementation	Review cycle (years)	Describe spatial boundary
National	National Operational Plan for the fishery sector	December 2007	4.5	Italian territorial waters (up to 12 nm from the shoreline)
National	National Strategic Plan	July 2007	NA	Italian territorial waters (up to 12 nm from the shoreline)
National	Management Plan GSA 10 Middle-South Tyrrenian Sea. Trawl	June 2010	0.5	Italian territorial waters (up to 12 nm from the coastline) within GSA 10
National	Management Plan GSA 16 (Sicily Strait). Trawl > 18m	June 2010	4.5	Italian territorial waters (up to 12 nm from the shoreline) within GSA 16
National	Sicilian management Plan. Trawl LOB < 18m	June 2010	4.5	Italian territorial waters (up to 12 nm from the shoreline)
National	National Management Plan for boat seines	January 2011	1	Italian territorial waters (up to 12 nm from the shoreline)
National	Management Plan of the Sicilian fleet - purse seines for small pelagic fishes	October 2008	1	Italian territorial waters (up to 12 nm from the shoreline)
National	National Industrial Plan (NA)	NA	NA	Italian territorial waters (up to 12 nm from the shoreline)
National	National Energetic Plan (NA)	NA	NA	Italian territorial waters (up to 12 nm from the shoreline)
National	National Environmental Plan (NA)	NA	NA	Italian territorial waters (up to 12 nm from the shoreline)
National	National Strategic Plan	July 2007	NA	Italian territorial waters (up to 12 nm from the shoreline)
Local	Sicilian Energetic and Environmental Plan	2006	NA	Sicilian waters (up to 12 nm from the shoreline)
Local	Local (municipalities) regulatory plans	NA	NA	Coastline within the municipality
Local	Local Management Plan of the maritime compartment of Mazara del Vallo	March 2012	1	Maritime compartment of Mazara del Vallo
Local	Local Management Plan of the maritime compartment of Trapani	March 2012	1	Italian waters off the coastline from Castellammare del Golfo to Marsala, including the Egadi Islands
Local	Local Management Plan of the Pelagie Islands	2012	1	Italian waters around Pantelleria Island in GSA 13
Local	Local Management Plan of the Pantelleria Island	2012	1	Italian waters around Linosa, Lampedusa and Lampione islands in GSA 16
National	Water Catchment Management Plan	22nd March 2011	6	Whole territory of the Maltese Islands up to 1NM
National	Conservation area around wrecks	2008	NA	Maltese territorial waters
National	Trawling areas as in EC 1967/2006	2006	NA	Within 25Nm from Malta
National	Waste Management Plan	2004	NA	Maltese territorial waters
National	Malta's Fisheries Management Plan	2007	1	Maltese territorial waters
National	Malta's National Strategic Plan for Fisheries 2007-2013	NA	5 years	Maltese territorial waters
National	Fisheries Operational Programme for Malta	October 2008	1	Maltese territorial waters
Local	Integrated Coastal Zone Management (ICZM)	August 1997	Depending on the terms of agreement	Ghajn Tuffieha Bay (Malta)
Local	Integrated Coastal Zone Management (ICZM)	May 2001	Depending on the terms of agreement	Ramla Bay (Gozo).
Local	Grand Harbour Local Plan	August 2006	10	Grand Harbour area in Malta
Local	Central Malta Local Plan	August 2006	10	Along the Maltese coast road
Local	Gozo and Comino Local Plan	August 2006	10	Marine area around Gozo and Comino
Local	North Harbour Local Plan	August 2006	10	North part of Malta
Local	North West Local Plan	August 2006	10	North west part of Malta
Local	South Malta Local Plan	August 2006	10	South part of Malta
Local	Marsaxlokk Bay Local Plan	Approved 1995	10	South part of Malta
Local	Blue Flag Beach	2003	NA	Beach of Bugibba in St.Paul's Bay (Malta)
Local	Blue Flag Beach	2003	NA	Beach of Paceville in St. Julians (Malta)
Local	Yelkouan Shearwater	2008	NA	NE of Malta

Action 1a.2 Identifying and mapping sectors and activities

Compile a list of sectors and activities present in your area and indicate whether they are active and if they have a spatial management initiative. This can be achieved by completing columns 1 to 4 of table 1a.2, which was adapted from the MarLIN table of sectors and activities. Please note this is an example of a table that could be used to complete this action and can be further modified to reflect the sectors, drivers and activities relevant to the SMA. For an alternative list of sectors and activities, it may be helpful to refer to the suite of Linkage Tables[1] and associated Guidance[2] produced as part of the 'Options for Delivering Ecosystem-Based Marine Management ' (ODEMM) EU FP7 Project.

Next, compile GIS layers of the spatial extent of the different sectors (and communicate information about the metadata to WP5). These layers will be used in subsequent steps for estimating cumulative pressures and impacts on ecosystem components.

For those sectors and activities which have a spatial management initiative, fill out columns 5 to 10 of table 1a.2. If there is little or no information on sectors and activities, omit this section and move on to action 1a.3.

[1] http://www.liv.ac.uk/odemm/data/
[2] http://www.liv.ac.uk/odemm/guidancedocuments/

Table 1a.2. Adapted MarLIN table of sectors and activities in the Strait of Sicily.

1. Sector/Driver	2. Activity	8. Plan name	9. Date of implementation	10. Length of initiative?
Aquaculture	Fin-fish	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Central Malta Local Plan	August 2006	10 years
		Gozo and Comino Local Plan	August 2006	10 years
		North West Local Plan	August 2006	10 years
		South Malta Local Plan	August 2006	10 years
		Marsaxlokk Local Plan	1995 (approved)	10 years
	Macro-algae			
	Predator control			
	Shellfisheries			
	Current change			
Climate change	Sea level change			
	Temperature change			
	Weather pattern change			
	Barrage			
Coastal defence	Beach replenishment	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Local (municipalities) regulatory plans	NA	NA
		Water Catchment Management Plan	22nd March 2011	6 years
		Blue Flag Beach Plans	2003	NA
	Groynes	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
	Sea walls/ breakwaters			
	Bait digging			
	Bird eggs			
	Curios			
Collecting	Higher plants			
	Kelp & wrack harvesting			
	Macro-algae			
	Peelers (boulder turning)			
	Shellfish			
Development	Construction phase	Local (municipalities) regulatory plans	NA	NA
		Local (municipalities) regulatory plans	NA	NA
	Artificial reefs	Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Trawling Areas as in EC 1997/2006	2006	NA
		Conservation Areas around wrecks	2008	NA
	Communication cables			
	Culverting lagoons			

	Dock/port facilities	National Industrial Plan (NA)	NA	NA
		Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Central Malta Local Plan	August 2006	10 years
		Gozo and Comino Local Plan	August 2006	10 years
		North West Local Plan	August 2006	10 years
		South Malta Local Plan	August 2006	10 years
		Marsaxlokk Local Plan	1995 (approved)	10 years
		Grand Harbour Local Plan	August 2006	10 years
		North Harbour Local Plan	August 2006	10 years
	Land claim			
	Marinas	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Central Malta Local Plan	August 2006	10 years
		Gozo and Comino Local Plan	August 2006	10 years
		North West Local Plan	August 2006	10 years
		South Malta Local Plan	August 2006	10 years
		Marsaxlokk Local Plan	1995 (approved)	10 years
	Oil & gas platforms	National Energetic Plan (NA)	NA	NA
		National Environmental Plan (NA)	NA	NA
		National Strategic Plan	July 2007	NA
		Sicilian Energetic and Environmental Plan	2006	NA
	Urban	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Central Malta Local Plan	August 2006	10 years
		Gozo and Comino Local Plan	August 2006	10 years
		North West Local Plan	August 2006	10 years
		South Malta Local Plan	August 2006	10 years
		Marsaxlokk Local Plan	1995 (approved)	10 years
Dredging	Capital dredging	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Grand Harbour Local Plan	August 2006	10 years
		North Harbour Local Plan	August 2006	10 years
	Maintenance dredging	Local (municipalities) regulatory plans	NA	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Grand Harbour Local Plan	August 2006	10 years
		North Harbour Local Plan	August 2006	10 years
Energy generation	Nuclear power generation			
	Power stations	National Energetic Plan (NA)	NA	NA
		National Environmental Plan (NA)	NA	NA
		National Industrial Plan (NA)	NA	NA
		Sicilian Energetic and Environmental Plan	2006	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
	Renewable (wind/tide/wave)	National Energetic Plan (NA)	NA	NA
		National Environmental Plan (NA)	NA	NA
		National Industrial Plan (NA)	NA	NA
		Sicilian Energetic and Environmental Plan	2006	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable

Extraction	Maerl			
	Rock/ minerals (coastal quarrying)			
	Oil & gas	National Energetic Plan (NA)	NA	NA
		National Environmental Plan (NA)	NA	NA
		Sicilian Energetic and Environmental Plan	2006	NA
		Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
	Sand/ gravel (aggregates)			
	Water resources (abstraction)			
Fisheries	Benthic trawls (e.g. Scallop dredging)			
	Netting (e.g. Fixed nets)	See artisanal fishing for gillnets		
	Pelagic trawls			
	Demersal trawls	National Fisheries Plan	2007	5 years
		National Strategic Plan 2007-2013. Fisheries	2007	5 years
		National Operative Plan 2007-2013. Fisheries	2007	5 years
		Local Management Plan GSA 16 (Strait of Sicily). Trawlers LOB>18 m.	2007	5 years
		Local Management Plan of the maritime compartment of Mazara del Vallo	March 2012	1 year
		Local Management Plan of the maritime compartment of Trapani	March 2012	1 year
		Local Management Plan of the maritime compartment of Pantelleria	2012	1 year
		Local Management Plan of the maritime compartment of the Pelagie Islands	2012	1 year
		Malta's National Strategic Plan	2007	5 years
		Malta Management Plan GSA 15	2007	5 years
	Pelagic long line	National Fisheries Plan	2007	5 years
		National Strategic Plan 2007-2013. Fisheries	2007	5 years
		National Operative Plan 2007-2013. Fisheries	2007	5 years
		Local Management Plan of the maritime compartment of Mazara del Vallo	March 2012	1 year
		Local Management Plan of the maritime compartment of Trapani	March 2012	1 year
		Local Management Plan of the maritime compartment of Pantelleria	2012	1 year
		Local Management Plan of the maritime compartment of the Pelagie Islands	2012	1 year
		Malta's National Strategic Plan	2007	5 years
		Malta Management Plan GSA 15	2007	5 years
	Pelagic purse seine	National Fisheries Plan	2007	5 years
		National Strategic Plan 2007-2013. Fisheries	2007	5 years
		National Operative Plan 2007-2013. Fisheries	2007	5 years
		Management Plan for Sicilian small pelagic fisheries by purse seine	October 2008	4 years
		Local Management Plan of the maritime compartment of Mazara del Vallo	March 2012	1 year
		Local Management Plan of the maritime compartment of Trapani	March 2012	1 year
		Local Management Plan of the maritime compartment of Pantelleria	2012	1 year
		Local Management Plan of the maritime compartment of the Pelagie Islands	2012	1 year
		Malta's National Strategic Plan	2007	5 years
		Malta Management Plan GSA 15	2007	5 years
	Pelagic FAD	Malta's National Strategic Plan	2007	5 years
		Malta Management Plan GSA 15	2007	5 years
	Artisanal fishing (e.g. gillnet, bottom long line)	Integrated Coastal Zone Management (ICZM)	August 1997	Variable
		Integrated Coastal Zone Management (ICZM)	May 2001	Variable
		Central Malta Local Plan	August 2006	10 years
		Gozo and Comino Local Plan	August 2006	10 years
		North West Local Plan	August 2006	10 years
		South Malta Local Plan	August 2006	10 years
		Marsaxlokk Local Plan	1995 (approved)	10 years
		Local Management Plan of the maritime compartment of Mazara del Vallo	March 2012	1 year
		Local Management Plan of the maritime compartment of Trapani	March 2012	1 year
		Local Management Plan of the maritime compartment of Pantelleria	2012	1 year
		Local Management Plan of the maritime compartment of the Pelagie Islands	2012	1 year

	Potting/ creeling	Regardedas artisanal fishing			
	Suction (hydraulic) dredging				
	Angling				
Recreation	Boating/ yachting				
	Diving/ dive site				
	Public beach				
	Tourist resort				
	Water sports				
	Animal sanctuaries				
	Archaeology				
	Coastal farming				
	Coastal forestry				
Uses	Education/ Interpretation				
	Military				
	Mooring/ beaching/ launching				
	Research				
	Shipping				
	Fishery & agriculture wastes				
	Industrial effluent discharge				
	Industrial/ urban emissions (air)				
	Inorganic mine and particulate wastes				
Wastes	Land/ waterfront runoff				
	Litter and debris				
	Nuclear effluent discharge				
	Sewage discharge				
	Brine discharge	NA	NA	NA	
	Shipping wastes				
	Spoil dumping				
	Thermal discharges (cooling water)				
Other	Removal of substratum				

Action 1a.3 Assessing institutional landscapes

The assessment of the institutional landscape for a given case study will compile information on regulatory bodies, national maritime jurisdictions, sectoral legislation, policies etc. This will also be explored through the WP6 governance analysis, particularly in section 1.3 of the Governance Analytical Structure.

Institutional landscape in the Strait of Sicily:

1. REGULATORY BODIES

1.1. INTERNATIONAL

- International Maritime Organization (IMO)
- United Nations Development Assistance Framework (UNDAF)
- The World Conservation Union – IUCN
- World Wide Fund for Nature (WWF)
- International Council for the Exploration of the Sea (ICES)
- International Commission for the Conservation of Atlantic Tunas (ICCAT)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- Food and Agriculture Organization (FAO)
    - General Fisheries Commission for the Mediterranean (GFCM)

1.2. MEDITERRANEAN

- Marine Action Plan for the Mediterranean (MAP) Phase II Coordinating Unit (MEDU)
- Mediterranean Sustainable Development Commission (MSDC)
- Regional Activity Centres (RACs)
- Regional Activity Centre for the Blue Plan/Plan Bleu - RAC/BP
- Regional Activity Centre for the Priority Actions Programme - RAC/PAP
- Mediterranean Regional Centre for Emergency Action against Accidental Pollution – REMPEC
- Regional Activity Centre for Information and Communication - RAC/INFO
- Regional Activity Centre for Cleaner Production - RAC/CP
- Regional Activity Centre for Specially Protected Areas - RAC/SPA

1.3. EUROPEAN

- European Council
- European Science Foundation (ESF)
    - Marine Board
- European Fisheries and Aquaculture Research Organization (EFARO)

1.4. ITALIAN

- Ministry of Agricultural and Fishery Policies (MIPAF)
- Ministry of the Environment, Territory and Sea (Miistero dell'Ambiente e della tutela del Territorio e del Mare)
- Comitato per le aree naturali protette

1.5. SICILIAN

- Assessorato Territorio e Ambiente (ARTA)
- Assessorato Regionale delle Risorse Agricole e Alimentari
    - Dipartimento degli interventi per la Pesca
- Consiglio Regionale della Pesca (CRP)
- Assessorato all'Ambiente Provincia di Trapani

- Assessorato all'Ambiente Provincia di Agrigento
- Municipality of Favignana
- Municipality of Lampedusa e Linosa
- Municipality of Pantelleria
- Co.Ge.P.A. (association of local authorities) of Trapani
- Co.Ge.P.A. (association of local authorities) of Mazara del Vallo
- Co.Ge.P.A. (association of local authorities) of the Pantelleria Island
- Co.Ge.P.A. (association of local authorities) of the Pelagie Islands
- Conference of services: Ministry for the Economic Development
- Conference of services: Ministry for the Environment, the Territory and the Sea
- Conference of services: Sicilian government representatives (ad hoc)
- Conference of services: Councillorships (ad hoc)

1.6. MALTESE

- Ministry for Resources and Rural Affiars (MRRA)
- MEPA (Malta Environment and Planning Authority)
- Office of the Prime Minister (OPM)
- Ministry for Infrastructure, Transport and Communications (MITC)
- Ministry of Finance, the Economy and Investment
- Ministry for Justice and Home Affairs (MJHA)

1.7. COUNTRIES

- Italy
- Malta

1.8. RESEARCH INSTITUTES

- IAMC - CNR
- University of Palermo
- University of Catania
- University of Messina
- ISPRA
- INGV
- MRRA - FCD

2. LEGISLATION AND POLICIES

2.1. INTERNATIONAL

- United Nations Agenda 21
- United Nations Convention on Biological Diversity
- United Nations Convention on the Law Of the Sea (UNCLOS)
- International Convention for the Prevention of Pollution From Ships (MARPOL)
- ICES Convention
- FAO Code of Conduct for Responsible Fisheries

2.2. MEDITERRANEAN

- Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II)
- MAP policy (in particular SPA/DB Protocol)

2.3. EUROPE

- Strategic Environmental Assessment Directive (SEAD)

- Directive 2000/60/EC (Water Framework Directive - WFD)
- Marine Strategy Framework Directive (MSFD)
- Common Fisheries Policy (CFP)
- Council regulation (EC) 2371/2002, art. 37 (m): conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy
- Habitats Directive 92/43/EEC
- Directive 2009/147/EC (Birds Directive)
- Biodiversity Strategy 2020
- EC Communication. Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU

2.4. ITALY

- L. no. 347/1978
- D.M. no. 0010988 06/12/2010

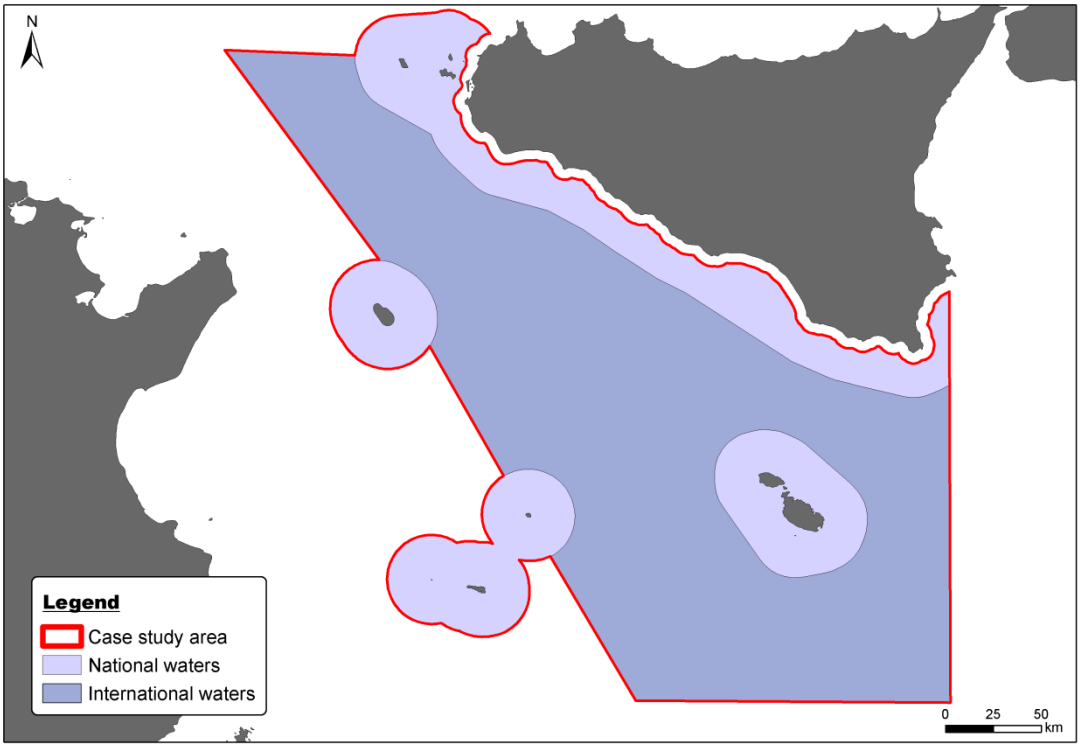
2.5. SICILY

- L.R. no. 40/1983
- L.R. no. 95/1984
- L.R. no. 26/1987
- L.R. no. 25/1990
- L.R. no. 26/1998

2.6. MALTA

- Fisheries Management Zone
- Fish Farming Policy Guidelines
- Development Planning Act
- Flora, Fauna and Natural Habitats Protection Regulation
- Antiquities Protection Act
- Maltese Legal Act: Fisheries Conservation and Management Act
- Government Notice 173 of 1990
- Environment Protection Act
- EC 813/2004 Regulation: register for the fishing fleet closed
- Legal Notice no 407 of 2004: operations and registration of the fishing fleet
- Government Notice 206 of 1934: fishing restricted to certain areas
- Notice to Mariners no 67 of 2004
- Notice to Mariners no 5 of 2008 Conservation area around wrecks
- Notice to Mariners no 6 of 2008 Protection of Yelkouan Shearwaters
- Legal Notice 357 of 2010 regarding the licence for diving services
- Legal notice 410 of 2007: licence to retain submarine cables and pipelines
- Bathing Water Directive and UN Barcelona Convention on the quality of water under LN 380/2003
- Marine Strategy Framework Directive

Where appropriate, compile GIS layers to illustrate any identified boundaries or areas to which any policies or legislation are applicable.



Action 1a.4 Finalise the spatial boundary

Using the information collected in previous steps and the GIS layers available, develop a spatial boundary for your SMA. The decision tree below (figure 1a.4) provides guidance on how to use your information to define the spatial boundary of your SMA.

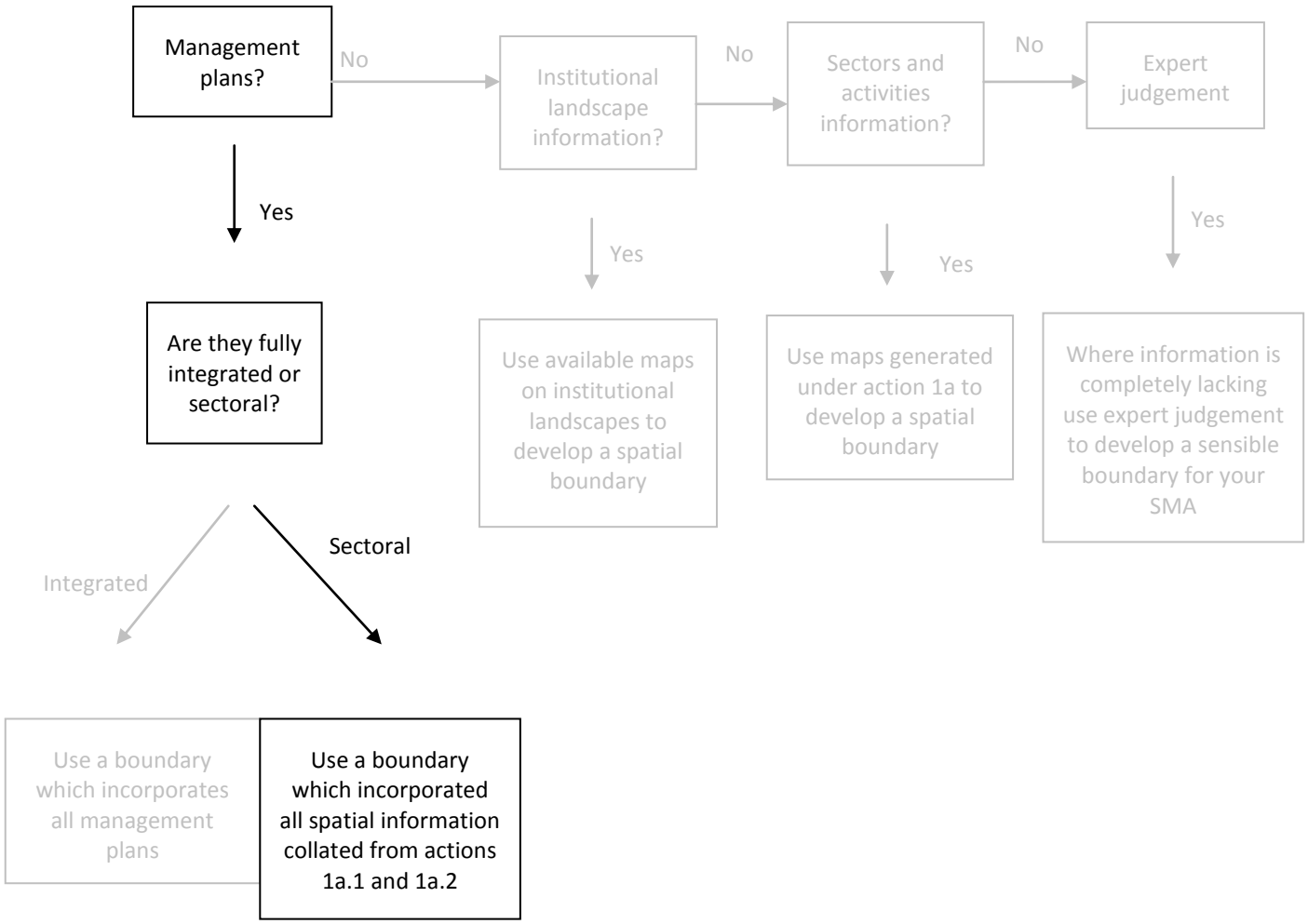
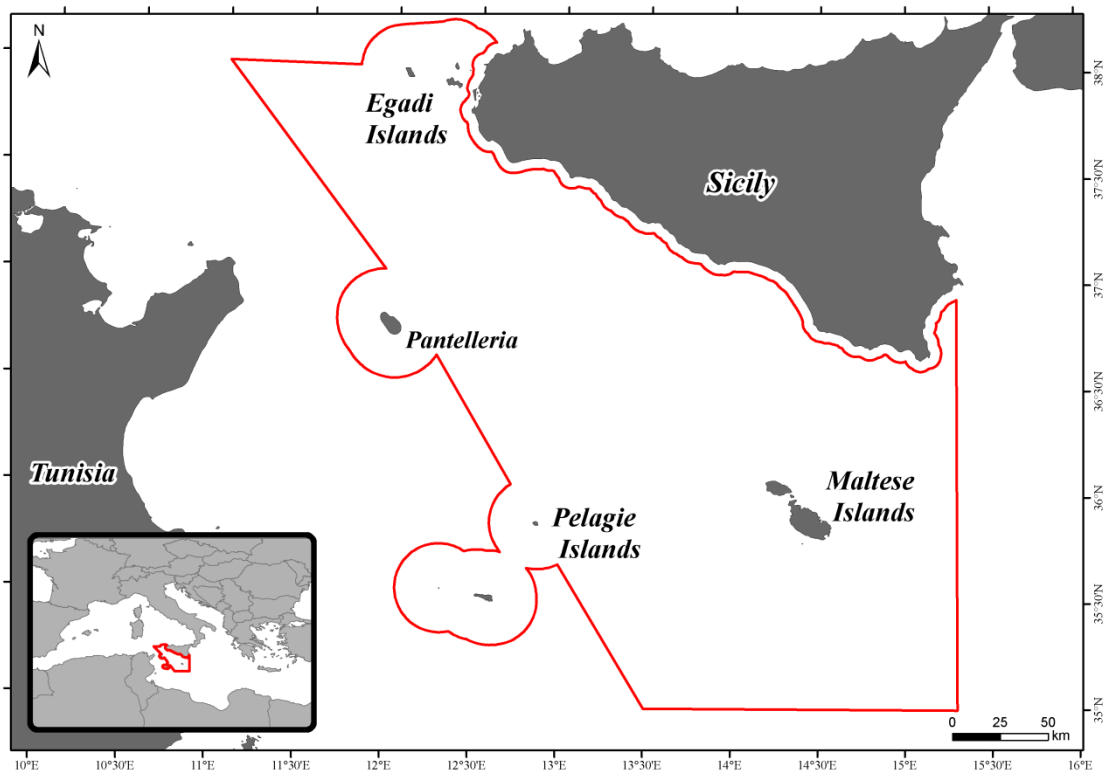


Figure 1a.4. Flow chart to help define the spatial boundary.

Create a GIS layer to display the final SMA spatial boundary. Provide a brief textual description of this boundary and a summary of the reasons for its selection.

The Strait of Sicily is defined as the part of the Central Mediterranean Sea comprised between the international waters off the African coast, the southern coast of Sicily and the waters surrounding the Maltese archipelago. It roughly coincides with the FAO GSAs 15 and 16, plus a tiny part of the GSAs 12 (northern tip of the Egadi Islands) and 13 (Pantelleria Island). The boundaries were defined to encompass an unique oceanographic unit characterized by intense water fluxes, high energy regimes, extended continental shelfs and high biodiversity and productivity levels. The whole area has been heavily exploited by fisheries since ancient times and most of t he problems and conflicts pervade the entire area.



Omit action 1a.5 and progress to step 1b.

Action 1a.5 Summarise boundary information

The manual has directed you straight to this action if you are evaluating a single spatial management plan (for which boundary information is available). Collate and summarise in table 1a.5, the boundary information for the spatial management plan. The spatial extent of the study should then be mapped using GIS software. This map may take the form of a basic polygon of the area under management or it may be a more complex map of each of the managed areas.

Once this action is complete, progress to action 1b.8.

Table 1a.5.

Name of plan/initiative	Date of implementation	Review cycle (years)	Describe the spatial boundary	Sectors included in the spatial management plan	Sectors not included in management plan but active in the area

Step 1b Goals and operational objectives for the SMA

This step aims to set the context of the SMA by defining the goals and operational objectives. **It is carried out alongside step 1a,** as together they provide details of the physical area as well as the overarching goals and objectives to be evaluated. Step 1b uses similar literature and approach to step 1a. The first actions include identification of the existing or proposed management initiative and collection of objectives which may come from legal obligations. In order to assess operational objectives they should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound). The validity of the goals and objectives and whether they are SMART will be evaluated from a scientific perspective through the MESMA framework, focusing on how well they address the need to contribute to a healthy and functioning ecosystem. An example would be achieving good environmental status as requested in the Marine Strategy Framework Directive.

The output is a list of clearly defined operational objectives for the SMA and a paragraph describing any potential compliance issues with respect to laws in the SMA. The list of goals and operational objectives is then used in step 3 to choose indicators, step 5 to assess if these objectives have been achieved or are likely to be achieved, step 6 to identify reasons why operational objectives were or were not met, and finally in step 7 to identify adaptive management needs. An additional output from step 1b is a list of sectoral interests and stakeholders in the SMA; information gathered in the governance analysis may assist in completion of this step.

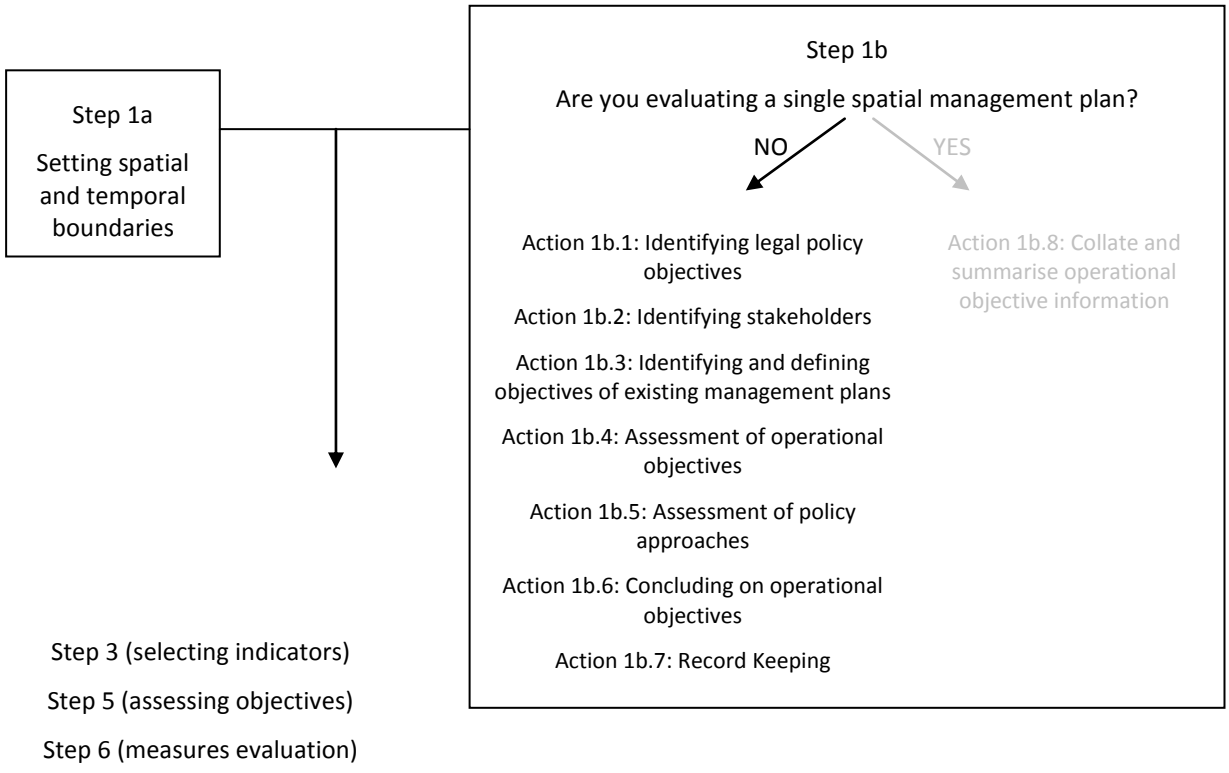


Figure 1b. Work flow for step 1b.

Action 1b.1 Identifying legal policy objectives

Legal obligations are clearly defined and recorded. Using available sources, list the laws, statutes and regulations applicable to the area, including domestic legislation, transposing international and European obligations and local byelaws. Expert legal opinion should be obtained to ensure that all obligations have been identified and recorded in table 1b.3.

Identify related policy objectives and guidance (that relate to the chosen evaluation focus) and complete table 1b.1 below.

Table 1b.1. Legal policy objectives and guidance.

Operational level (local, national etc)	Statute - title and reference	Implementing department or agency	Key regulations and byelaws - reference	Related policy objectives and guidance - reference	GIS layer file name (if available)
[69] International	[69] International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), adopted 2004, not in force	Signatory countries	Sets out provisions on facilities for the reception of sediments, on scientific and technical research and monitoring, on survey certification and inspection, and on technical assistance and cooperation. The annexes carry provisions on management and control requirements for ships, standards for ballast water management, and survey and certification requirements for ballast water management	Relates to nature conservation, particularly the preservation of local biodiversity and the health level of the local environment – It makes it by preventing, minimizing and ultimately eliminating the transfer of harmful aquatic organisms and pathogens through the control and management of ships´ ballast water and sediments	
[83] International	[83] UN General Assembly resolution 58/14, 2004	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-	

				net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[82] International	[82] UN General Assembly resolution 57/142, 2003	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[81] International	[81] UN General Assembly resolution 55/8, 2001	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[72] International	[72] Voluntary instrument - FAO	Signatory countries	Actions for States including port	Relates to fisheries	

	International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, adopted 2001		States and market States, to overcome illegal, unreported and unregulated fishing	sustainability, particularly to (1) the reduction of fishing effort and (2) its maintenance within safe laves. It makes it by (1) achieving world-wide preferably by 2003, but not later than 2005, an efficient, equitable and transparent management of fishing capacity; and (2) exercising caution to avoid growth in capacity undermining long-term sustainability objectives	
[80] International	[80] UN General Assembly resolution 53/33, 1999	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[79] International	[79] UN General Assembly resolution 52/29, 1998	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to	

				the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[61] International	[61] Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 7 November 1996	Signatory countries	Regulates dumping in the marine environment	Relates to nature conservation, particularly with the MSFD high level goal of maintenance of a healthy environment; It makes it by controlling pollution of the sea by dumping and by encouraging regional agreements supplementary to the Convention	
[78] International	[78] UN General Assembly resolution 51/36, 1996	Signatory countries	Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction;	

				and by limiting fisheries by-catch and discards	
[77] International	[77] UN General Assembly resolution 50/25, 1995		Compliance with UN General Assembly resolution 46/215	Relates to fisheries sustainability and specifically to the reduction of fishing effort and by-catch; It makes it by avoiding large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; and by limiting fisheries by-catch and discards	
[62] International	[62] Voluntary instrument - Washington Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, adopted 1995			Relates to nature conservation, particularly with the high level goal of maintenance of a healthy environment	
[84] International	[84] Agreement for the Implementation of the Provisions of the UNCLOS of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, adopted 1995, in force			Relates to nature conservation and fisheries sustainability, particularly the sustainable management of straddling and highly migratory fish stocks in areas beyond national jurisdiction	
[71] International	[71] Voluntary instrument - FAO		It (1) establishes of principles, in	Relates to nature	

	Code of Conduct for Responsible Fisheries, adopted 31 October 1995, enforcement not applicable		accordance with the relevant rules of international law, for responsible fishing and fisheries activities, taking into account all their relevant biological, technological, economic, social, environmental and commercial aspects; (2) establishes principles and criteria for the elaboration and implementation of national policies for responsible conservation of fisheries resources and fisheries management and development; (3) serves as an instrument of reference to help States to establish or to improve the legal and institutional framework required for the exercise of responsible fisheries and in the formulation and implementation of appropriate measures; (4) provides guidance which may be used where appropriate in the formulation and implementation of international agreements and other legal instruments, both	conservation and sustainability of fisheries	

			binding and voluntary; (5) facilitates and promotes technical, financial and other cooperation in conservation of fisheries resources and fisheries management and development; (6) promotes the contribution of fisheries to food security and food quality, giving priority to the nutritional needs of local communities; (7) promotes protection of living aquatic resources and their environments and coastal areas; (8) promotes the trade of fish and fishery products in conformity with relevant international rules and avoid the use of measures that constitute hidden barriers to such trade; (9) promotes research on fisheries as well as on associated ecosystems and relevant environmental factors; and (10) provides standards of conduct for all persons involved in the fisheries sector		
[85]	[85] Agreement to Promote		It (1) improves compliance by	Relates to nature	

International	Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, adopted November 1993, in force since 24 April 2003		fishing vessels with high seas international conservation and management measures.; (2) sets rules for dispute resolution between different bodies with competence on the high seas (e.g. ICCAT and GFCM)	conservation and fisheries sustainability	
[66] International	[66] Treaty - United Nations Convention on Biological Diversity, adopted 1992, in force		It promotes (1) the conservation of biological diversity; (2) the sustainable use of its components; (3) the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources. In the case of components of biodiversity applies within the limits of national jurisdiction. In the case of processes and activities carried out under a party's jurisdiction or control applies within or outside the limits of national jurisdiction	Relates to nature conservation and fisheries sustainability	
[76] International	[76] UN General Assembly resolution 46/215, 1991		It (1) asks for measures to avoid large-scale pelagic drift-net fishing and unauthorized fishing in zones of national jurisdiction; (2) limits fisheries by-catch and discards; (3) makes recommendations for international cooperation to	Relates to nature conservation and fisheries sustainability	

			get sound scientific knowledge on the matter		
[75] International	[75] UN General Assembly resolution 45/197, 1990		It promotes a worldwide moratorium on all pelagic driftnet fishing	It relates to nature conservation and fisheries sustainability	
[74] International	[74] UN General Assembly resolution 44/225, 1989		It raises concern about the size of the fleets, the length of the nets, their mode of operation, their potential impact on anadromous and highly migratory species, their by-catch and the concern of coastal countries on the state of resources close to their exclusive economic zones. An ultimate aim is to cease large-scale high seas driftnet fishing elsewhere in the world by 30 June 1992 at the latest	It relates to nature conservation and fisheries sustainability	
[63] International	[63] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, adopted 1989, in force		It promotes a healthy environmental status. In particular it is aimed to achieve Environmentally Sound Management (ESM) in order to (1) protect human health and (2) the environment by minimizing hazardous waste production whenever possible and regulating transboundary movements of hazardous	Relates to nature conservation and fisheries sustainability	

			wastes, including by maritime ways		
[67] International	[67] United Nations Convention on the Law Of the Sea (UNCLOS), adopted on 10 Dec 1982, in force since 16 Nov 1994 (1833 UNTS 31363)	States, directly or through competent international organizations	It contains regimes regarding protection and preservation of the marine environment. It represents a main reference in international maritime law and contain regimes for territorial seas, exclusive economic zones, continental shelf, high seas, marine scientific research, and dispute resolution	Relates to nature conservation as well as fisheries	
[64] International	[64] Voluntary instrument - UNEP Conclusions of the study of the legal aspects concerning the environment related to offshore mining and drilling within the limits of national jurisdiction, adopted 1982		It contains regimes to (1) improve environmental management; and (2) protect the marine environment in the face of hydrocarbon exploitation	It relates to nature conservation	
[86] International	[86] Convention on the Conservation of Migratory Species of Wild Animals (CMS) adopted 23 June 1979, in force since 1 November 1983		It promotes the conservation and restoration of habitats of importance for endangered migratory species; (2) the allowance of transboundary movements by migratory species; and (3) the avoidance of further endangering of migratory species	It relates to nature conservation	
[68] International	[68] International Convention for the Prevention of		It (1) promotes safety at sea to protect	It relates to nature conservation,	

	Pollution From Ships (MARPOL), adopted 2 Nov 1973, adopted 1973, in force since 2 Oct 1983 as amended by the London Protocol of 1 Jun 1978 (1340 UNTS 61)		passengers and crew members; and (2) also protect the marine environment and coastal regions. Relates to good environmental status because prevents pollution of the marine environment by the discharge of harmful substances or effluents containing such substances in contravention of the treaty. Applies to ships, fixed and floating platforms	particularly environmental protection	
[87] International	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), adopted 1973, in force		It calls for avoiding threatening wild fauna and flora by international trade in specimens	It relates to nature conservation	
[60] International	[60] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, LC) of 29 December 1972, in force since 30 Aug 1975 (11 ILM 1294)		It controls pollution of the sea by dumping and by encouraging regional agreements supplementary to the Convention. It covers the deliberate disposal at sea of wastes or other matter from vessels, aircraft, and platforms	Relates to nature conservation and particularly to environmental protection	
[88] International	[88] Convention Concerning the Protection of the World Cultural and Natural Heritage,		It promotes (1) the protection of natural outstanding values; and (2) the protection of	Relates to nature conservation and fisheries, particularly artisanal	

	adopted 1972, in force (Malta within the Study Area)		cultural heritage. It establishes the duty of protection of natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty	fisheries	
[73] International	[73] Treaty for the establishment of the International Convention for the Conservation of Atlantic Tunas (ICCAT) adopted 1969, in force 1992, protocol not yet in force		It promotes cooperation for maintaining the populations of tuna and tuna-like fish found in the Atlantic Ocean at levels which permit the maximum sustainable catch for food and other purposes	Relates to fisheries	
[59c] International	Convention on the High Seas of 29 April 1958 (UNTS 450, p. 11-82), in force since 27 Jan 1980		It guarantees (1) freedom of navigation; (2) freedom of fishing; (3) freedom to lay submarine cables and pipelines over the high seas	Relates to fishing	
[89] International	[89] International Convention for the Regulation of Whaling of 2 December 1946 (62 Stat. 1716, 161 UNTS 72), adopted in 1946, in force		Establishes a moratorium on all commercial whaling under the treaty, with few exceptions. It is aimed to (1) protect whales from overhunting; (2) regulate whale fisheries to ensure proper conservation; and (3) allow development of whale stocks	It relates to fisheries and nature conservation	
[102] Regional: Mediterranean	Protocol on Integrated Coastal Zone Management		Seventh of the seven protocols of the UNEP Mediterranean	Relates to nature conservation and fisheries	

	(ICZM) in force since 24 Mar 2011		Action Plan for the Barcelona Convention (BC) legal framework. It is aimed to (1) facilitate, through the rational planning of activities, the sustainable development of coastal zones by ensuring that the environment and landscapes are taken into account in harmony with economic, social and cultural development; (2) preserve coastal zones for the benefit of current and future generations; (3) ensure the sustainable use of natural resources, particularly with regard to water use; (4) ensure preservation of the integrity of coastal ecosystems, landscapes and geomorphology; (5) prevent and reducing the effects of natural hazards and in particular of climate change, which can be induced by natural or human activities; (6) achieve coherence between public and private initiatives and between	sustainability	

			all decisions by the public authorities, at the national, regional and local levels, which affect the use of the coastal zone		
[92] Regional: Mediterranean	[92] Agreement for the Establishment of the General Fisheries Commission for the Mediterranean, in force since 29 April 2004 as amended in 1997		It adopts binding measures for the conservation and rational management of living marine resources. The aims are (1) to promote the development, conservation, rational management and best utilization of living marine resources; (2) to promote the sustainable development of aquaculture in the Mediterranean, Black Sea and connecting waters	It relates to nature conservation and fisheries sustainability	
[91] Regional: Mediterranean	[91] Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area, adopted 24 November 1996, in force since 1 June 2001 (only Malta)		It establishes a general prohibition of deliberate taking of cetaceans. General duty regarding the creation and maintenance of a network of specially protected areas. Other specific duties. Aims are (1) to reduce threats to all cetaceans; (2) to promote closer cooperation among Parties; (3) to enforce legislation to prevent the deliberate taking	It relates to fisheries and nature conservation	

			of cetaceans in fisheries by vessels under the Parties' flag or within their jurisdiction; and (4) to minimise incidental catches		
[100] Regional: Mediterranean	Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal, 1996, not yet in force		Sixth of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC) legal framework. It prevents, abates and eliminates pollution by transboundary movements and disposal of hazardous wastes in the Mediterranean	It relates to nature conservation	
[97] Regional: Mediterranean	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (an amended version of the BC) 1995		It creates a legal and institutional framework that promotes the adoption of detailed (seven) Protocols and facilitates their implementation (e.g. by establishing provisions on monitoring, reporting, public participation, compliance control and dispute resolution). Its aims are (1) to assess and control marine pollution to ensure sustainable management of natural marine and coastal resources; (2) to integrate the environment in	It relates with nature conservation and fisheries sustainability	

			social and economic development; (3) to protect the marine environment and coastal zones through prevention and reduction of pollution, and as far as possible, elimination of pollution, whether land or sea-based; (4) to protect the natural and cultural heritage; (5) to strengthen solidarity among Mediterranean coastal States; (6) to contribute to improvement of the quality of life		
[90] Regional: Mediterranean	Specially Protected Areas and Biological Diversity Protocol (SPA protocol), adopted 10 June 1995, in force since 12 December 1999		It promotes the establishment of specially protected areas (SPAs) and specially protected areas of Mediterranean importance (SPAMIs). Aims are to safeguard: (1) representative types of coastal and marine ecosystems of adequate size to ensure their long-term viability and to maintain their biological diversity; (2) habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of	It relates to nature conservation	

			distribution as a consequence of their regression or on account of their intrinsically restricted area; (3) habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora or fauna; and (4) sites of particular importance because of their scientific, aesthetic, cultural or educational interest		
[101] Regional: Mediterranean	Protocol Concerning Mediterranean Specially Protected Areas (SPA protocol) adopted on 2 April 1982, in force since 1986; revised as the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA and Biodiversity Protocol) on 10 June 1995		Forth of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC) legal framework. Aims are to safeguard (1) representative types of coastal and marine ecosystems of adequate size to ensure their long-term viability and to maintain their biological diversity; (2) habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of distribution as a consequence of their regression or on account of	It relates to nature conservation.	

			their intrinsically restricted area; (3) habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora or fauna; (4) sites of particular importance because of their scientific, aesthetic, cultural or educational interest		
[99] Regional: Mediterranean	Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil, adopted 1994, not in force as 2004		Fifth of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC) legal framework. It establishes duties related to activities of scientific research on the resources of the seabed and its subsoil, exploration (i.e. seismological, surveys of the seabed and its subsoil, sample taking, exploration drilling), and exploitation activities. The aim is to prevent, reduce, combat and, as far as possible, eliminate pollution in the Zone of the Mediterranean Sea. See [99; 149; 151; 152; 168; 206; 213; 214]	It relates to nature conservation, particularly environmental protection	

[98] Regional: Mediterranean	[96] Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities, adopted 17 May 1980, in force since 17 June 1983		Third of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC) legal framework. Eliminates the inputs of Annex I toxic, persistent and bio-accumulating substances, through the use of regional plans and programmes; and regulates regimes for point source discharges and releases into water or air. . The aim is to prevent, reduce, combat and, as far as possible, eliminate pollution in the Mediterranean Sea	It relates to nature conservation, particularly to environmental protection	
[94] Regional: Mediterranean	Protocol for the Prevention and Elimination of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft, adopted in 1976; in force, but 1995 amendments not yet in force		First of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC) legal framework. The aim is to reduce pollution in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	It relates to nature conservation, particularly to environmental status	
[95] Regional: Mediterranean	Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and		Second of the seven protocols of the UNEP Mediterranean Action Plan (MAP) for the Barcelona Convention (BC)	It relates to nature conservation	

	other Harmful Substances in Cases of Emergency (Emergency Protocol); adopted on 16 February 1976, in force since 12 February 1978		legal framework. The aim is to reduce pollution in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development		
[96] Regional: Mediterranean	[95] Barcelona Convention (BC), adopted 16 February 1976, in force since 12 February 1978		Institutional framework that promotes the adoption of detailed Protocols and facilitates their implementation (e.g. by establishing provisions on monitoring, reporting, public participation, compliance control and dispute resolution). The overarching goal is to reduce pollution in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development. Specific protocols are aimed to (1) prevent, reduce, combat and, as far as possible, eliminate pollution in the Zone of the Mediterranean Sea; (2) attain the objective of sustainable development; (3) protect the	It relates to nature conservation, particularly to environmental protection	

			environment and to contribute to sustainable development; (4) promote the integrated management of coastal zones, taking into account the protection of zones of ecological and landscape interest and the rational use of natural resources; (5) apply the Convention and its Protocols; (6) formulate and adopt Protocols that prescribe agreed measures, procedures and regulations to apply the Convention; (7) promote, within the relevant international bodies, measures relating to the application of sustainable development programmes and environmental protection, conservation and rehabilitation and the natural resources of the Mediterranean Sea		
[86b] Regional: Mediterranean	Convention for the Protection Of The Mediterranean Sea Against Pollution - Barcelona Convention of 16 Feb 1976, in force since 12 Feb 1978 (revised on 10 Jun 1995		The aims are (1) to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area; and (2) to protect the marine environment and	It relates to nature conservation	

	as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean)		the natural resources of the Mediterranean Sea Area as a part of sustainable development		
[103a] European	Biodiversity Strategy 2020		Encompasses the Directive 2009/147/EC (Birds Directive) (OJ L 20, 26 Gen 2010, p. 7–25). . The overarching goal is the protection of biodiversity and halt of biodiversity loss within the EU by 2020	It relates to nature conservation, specifically biodiversity conservation	
[103b] European	Directive 2009/147/EC (Birds Directive) (OJ L 20, 26 Gen 2010, p. 7–25)		Currently under the Biodiversity Strategy 2020, it protects and restores the habitats of the bird species listed in the annexes. It (1) bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds, with a few exceptions; (2) manages (legitimate) hunting of some species, provided that this practice is sustainable; (3) requires Member States to outlaw all forms of non-selective and large scale	It relates to nature conservation	

			killing of birds; and (4) promotes research to underpin the protection, management and use of all species of birds covered by the Directive		
[104] European	Resolution 2009/89/CE of 4 Dec 2008 (OJ L 34 of 4 Feb 2009 p. 17-18)	European Council	. It consists on the signature of the protocol about ICZM in the Mediterranean by the EU, in line with the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (revised text of the Barcelona Convention). (1) To assess and control marine pollution to ensure sustainable management of natural marine and coastal resources; (2) to integrate the environment in social and economic development; (3) to protect the marine environment and coastal zones through prevention and reduction of pollution, and as far as possible, elimination of pollution, whether land or sea-based; (4) to protect the natural and cultural heritage; (5) to strengthen	It relates to nature conservation, particularly environmental status, and sustainability of fisheries	

			solidarity among Mediterranean coastal States; (6) to contribute to improvement of the quality of life		
[105] European	Council Regulation (EC) no. 1005/2008 of 29 Sep 2008 (OJ L 286 , 29/10/2008 p. 0001–0032)		Under the Common Fisheries Policy (CFP), it establishes a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999.	It relates to fisheries	
[106] European	Commission Decision 2008/949/EC of 6 Nov 2008 (OJ L 346 of 23/12/2008 p. 0037–0088)		Under the Common Fisheries Policy (CFP) , it adopts a multiannual Community programme pursuant to Council Regulation (EC) No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the CFP. The aims are (1) to establishing a Community framework for the collection, management and	It relates to fisheries	

			use of data in the fisheries sector; and (2) to support for scientific advice regarding the CFP		
[107] European	Resolution 2008/335/CE of the Commission of 28 Mar 2008 (OJ L 123, of 8 May 2008, p. 76-153)		It consists on the adoption of the first list of SACs for the Mediterranean biogeographic region, in line with Directive no. 92/43/CEE (notified as no. C(2008) 1148). The aim is the protection of biodiversity and halt of biodiversity loss within the EU (actually by 2020)	It relates to nature conservation	
[108] European	Council Regulation (EC) No 199/2008 of 25 Feb 2008 (OJ L 060 , 05/03/2008 p. 0001–0012)		Under the Common Fisheries Policy (CFP), it concerns the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the CFP. The aims are (1) the collection, management and use of data in the fisheries sector; and (2) the support for scientific advice regarding the CFP	It relates to fisheries	
[109] European	Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 (Marine Strategy Framework Directive, MSFD)		It establishes a framework within which Member States shall take the necessary measures to achieve or maintain good environmental	It relates to nature conservation, particularly environmental status	

	(OJ L 164, 25 Jun 2008, p. 19–40)		status in the marine environment by the year 2020 at the latest. The aims are (1) to protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected; and (2) to prevent and reduce inputs in the marine environment, with a view to phasing out pollution as defined in Article 3(8), so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea		
[109b] European	Commission Recommendation of 13 June 2007, notified under document number C(2007) 2551 (OJ L 159, 20/06/2007, p. 45-47)		It identifies a set of actions for the enforcement of Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade in these species by establishing conditions for their importation, exportation or re-exportation and on their movement within	It relates to nature conservation	

			the European Union (EU), in accordance with the CITES Convention. The aim is to ensure the protection and conservation of endangered species of wild fauna and flora		
[110] European	Council Regulation (EC) No 708/2007 of 11 June 2007 (OJ L 168 , 28/06/2007 p. 0001–0017)		Under the Common Fisheries Policy (CFP), it concerns use of alien and locally absent species in aquaculture. The aim is to regulate the use of alien and locally absent species in aquaculture	It relates to nature conservation (not to fisheries since aquaculture is considered a separate activity hereafter)	
[111] European	Commission Regulation (EC) No 498/2007 of 26 March 2007 (OJ L 120 , 10/05/2007 p. 0001-0080)		Under the Common Fisheries Policy (CFP), it lays down detailed rules for the implementation of Council Regulation (EC) No 1198/2006 on the European Fisheries Fund	It relates to fisheries	
[111b] European	Commission Recommendation No 2007/425/EC		It identifies a set of actions for the enforcement of Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein (CITES). See [87]	It relates to nature conservation	
[111c] European	Council Regulation (EC) No. 1967/2006 of 21 Dec 2006 (OJ L 409, 30/12/2006 p. 11-85)		It contains management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending	It relates to fisheries and nature conservation fisheries	

			Regulation (EEC) No. 2847/93 and repealing Regulation (EC) No. 1626/94. Extends its provisions to the Mediterranean High Sea for vessels under EU flags and EU citizens, including protection of species included in the Habitat Directive 92/43/EEC of 21 May 1992. The aims are (1) the protection of areas of aggregation of juveniles; (2) prohibition or strict regulation of harmful fishing gear; (3) reduction of the amount of discards; (4) management of fishing effort as the key to deliver sustainable fisheries; (5) protection of nursery and sensitive habitats; (6) enhance the social sustainability of Mediterranean; and (7) to ensure that leisure fishing does not interfere with commercial fishing and sustainable exploitation of fisheries; (8) establishes fishing protected areas within and beyond territorial seas		

[112] European	Council Regulation (EC) No 1198/2006 of 27 July 2006 (OJ L 223 , 15/08/2006 p. 0001–0044)		Under the Common Fisheries Policy (CFP), it implements the European Fisheries Fund	It relates to fisheries	
[112b] European	1083/2006 of 11 July 2006 repealing Regulation (EC) No 1260/1999		It lays down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund. This Regulation defines the context for cohesion policy (including cohesion, growth and employment); defines the objectives to which the Structural Funds and the Cohesion Fund are to contribute; defines the criteria Member States and regions must meet to be eligible for the Funds; defines the financial resources available and the criteria for allocating them; defines the principles and lays down the rules on partnership, programming, evaluation, management, monitoring and inspection. The aim is to strengthen economic and	It relates to fisheries	

			social cohesion in order to promote the harmonious, balanced and sustainable development of the European Union (EU) regions for the period 2007-2013		
[112b] European	Commission Regulation (EC) No 865/2006 of 4 May 2006 (OJ L 166, 19/06/2006, p. 1-69)		It lays down detailed rules concerning the implementation of Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade (CITES implementation). See [87]	It relates to nature conservation	
[113] European	Council Regulation (EC) No 861/2006 of 22 May 2006 (OJ L 160 , 14/06/2006 p. 0001-0011; Official Journal L 294 , 25/10/2006 p. 0201-0211)		Under the Common Fisheries Policy (CFP), it establishes Community financial measures for the implementation of the common fisheries policy and in the area of the Law of the Sea	It relates to fisheries	
[114a] European	Resolution of the EU Commission 2006/613/CE of 19 Jul 2006 (OJ L259 of 21 Sep 2006)	European Commission	It carries into effect the Directive 92/43/CEE and therefore adopts the list of SACs for the Mediterranean biogeographic region (notified as no. C(2006) 3261)	It relates to nature conservation	
[115a] European	Council Regulation (EC) No 768/2005 of 26 April 2005 (OJ L 128 , 21/05/2005 p. 0001-0014;		Under the Common Fisheries Policy (CFP), it establishes a Community Fisheries Control	It relates to fisheries	

	Official Journal L 164 , 16/06/2006 p. 0036-0049)		Agency and amending Regulation (EEC) No 2847/93 establishing a control system applicable to the common fisheries policy		
[115b] European	Council Framework Decision 2005/667/JHA of 12 July 2005 (OJ L 255, 30.9.2005, p. 164–167)		It provides legal enforcement of environmental protection	It relates to nature conservation	
[115c] European	Commission Decision 2005/629/EC of 26 August 2005 (OJ L 225 , 31/08/2005 p. 0018-0022)		Under the Common Fisheries Policy (CFP), it establishes a Scientific, Technical and Economic Committee to establish a control system for the Common Fisheries Policy	It relates to nature conservation	
[115d] European	Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 (OJ L 255, 30/09/2005, p. 11-21)		To ensure a high level of safety and environmental protection in relation to ship-source pollution from maritime transport	It relates to nature conservation, particularly environmental protection	
[116] European	Council Regulation (EC) No 1415/2004 of 19 July 2004 (OJ L 258 , 05/08/2004 p. 0001-0005; OJ L 142 , 30/05/2006 p. 0185-0189)		Under the Common Fisheries Policy (CFP), it fixes the maximum annual fishing effort for certain fishing areas and fisheries	It relates to fisheries	
[116b] European	Council Decision 2004/815/EC of 19 November 2004 (OJ L 357, 2 Dec 2004 p. 30)		Amends the Declaration 98/416/EC of 16 June 1998 (OJ L 190, 04/07/1998 p. 34-35) to adopt GFCM recommendations	It relates to fisheries	

			as binding principles		
[117] European	Council Regulation (EC) No 812/2004 of 26 April 2004 , in force (OJ L 150, 30 Apr 2004, p. 12-31)		It establish monitoring of pelagic trawl and tracking of incidental catches of cetaceans	It relates to nature conservation and fisheries	
[118] European	Council Decision 2004/585/EC of 19 July 2004 (OJ L 256 , 03/08/2004 p. 0017-0022; Official Journal L 142 , 30/05/2006 p. 0176-0181)		Under the Common Fisheries Policy (CFP), it establishes Regional Advisory Councils to establish an advisor system for the Common Fisheries Policy.	It relates to fisheries	
[119] European	Council Decision 2004/575/EC of 29 April 2004 (OJ L 261, 6 Aug 2004, p. 40–40)		It is a conclusion (adoption as law), on behalf of the European Community, of the Protocol to the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution, concerning cooperation in preventing pollution from ships and, in cases of emergency, combating pollution of the Mediterranean Sea	It relates to nature conservation, particularly environmental protection	
[120] European	Council decision 2004/465/EC of 29 Apr 2004 (OJ L 157 , 30/04/2004 p. 0114-0135)		Under the Common Fisheries Policy (CFP), it regards a Community financial contribution towards Member States fisheries control programmes	It relates to fisheries	
[121]	Directive		It establishes a	It relates to	

European	2004/35/EC of the European Parliament and of the Council of 21 April 2004 (Official Journal L 143 , 30 Apr 2004, p. 0056–0075)		framework of environmental liability based on the 'polluter-pays' principle, aimed to prevent and remedy environmental damage, including damage to protected species and natural habitats	nature conservation, particularly environmental protection	
[122] European	Council regulation (EC) No. 2371/2002 of 20 Dec 2002 (OJ L 358, 31 Dec 2002, p. 59-80)		Under the Common Fisheries Policy (CFP), it concerns the conservation and sustainable exploitation of fisheries resources. Powers and duties to EC institutions regarding fisheries conservation (coupled with integration of environmental protection requirements) as well as to Member States (coupled with the access restriction in the case of waters within 12 nm of coastal Member States' baselines). The aims are (1) conservation of fisheries; (2) sustainable exploitation of fisheries resources; (3) environmental protection; and (4) access restriction in the case of waters within 12 nm of coastal Member States' baselines	It relates to fisheries sustainability and nature protection	

[122b] European	Regulation (EC) No. 2099/2002 of the European Parliament and of the Council of 5 November 2002 (OJ L 324, 29/11/2002, p. 1-5)		It establishes a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS) and amending the Regulations on maritime safety and the prevention of pollution from ships. The aims are (1) to ensure human safety on board; and (2) to prevent marine pollution from ships	It relates to nature conservation, particularly for environmental protection	
[123] European	Rec. 2002/413 CE of 30 May 2002 (OJ L 148/24 of 6 Jun 2002)	European Parliament & European Council	It calls to carry into effect ICZM in Europe	It relates to nature conservation and fisheries	
[124] European	Council Decision 2001/431/EC of 28 May 2001 (OJ L 154, 09/06/2001 p. 0022-0040)		Under the Common Fisheries Policy (CFP), on a financial contribution by the Community to certain expenditure incurred by the Member States in implementing the control, inspection and surveillance systems applicable to the common fisheries policy	It relates to fisheries	
[125] European	Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 (Strategic Environmental Assessment Directive, SEAD) (OJ L 197, 21 Jul 2001, p. 30–37)		It ensures that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval or authorisation. The aims are (1) to provide a high	It relates to nature conservation and particularly environmental status	

			level of protection of the environment; and (2) to reduce the environmental impact of projects, plans and programmes		
[125b]	Decision No. 2850/2000/EC of the European Parliament and of the Council of 20 December 2000 (OJ L 332, 28/12/2000, p. 1-6)		It set up a Community framework for cooperation in the field of accidental or deliberate marine pollution, but excluding authorised discharges and continuous streams of pollution originating from land-based sources. The aims are (1) the protection of the marine environment, coastlines and human health against the risks of accidental or deliberate pollution at sea, excluding continuous streams of pollution originating from land-based sources; (2) to improve response in case of incidents involving spills or imminent threats of spills of oil or other harmful substances at sea and also to contribute to the prevention of the risks; (3) to strengthen the mutual assistance and	It relates to nature conservation, particularly environmental protection	

			cooperation between Member States in this field; and (4) to promote cooperation between Member States in order to provide for compensation for damage in accordance with the polluter-pays principle		
[125c] European	Regulation (EC) No 1655/2000 of the European Parliament and of the Council of 17 July 2000 (OJ L 192, 28/07/2000, p. 1-10)		It concerns the Financial Instrument for the Environment (LIFE) to contribute to the implementation of Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds, Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora and, in particular, the Natura 2000 European network established by the latter Directive. The aims are to contribute to the implementation, updating and development of Community environment policy and of environmental legislation, in particular as regards the integration of the environment into other policies, and to sustainable	It relates to nature conservation	

			development in the Community through funding of nature conservation projects		
[126] European	Council Regulation (EC) No 1543/2000 of 29 Jun 2000 (OJ L 176 , 15/07/2000 p. 0001-0016)		Under the Common Fisheries Policy (CFP) , it establishes a Community framework for the collection and management of the data needed to conduct the common fisheries policy	It relates to fisheries	
[127] European	Council Regulation (EC) No 657/2000 of 27 March 2000 (OJ L 080 , 31/03/2000 p. 0007-0008)		Under the Common Fisheries Policy (CFP), it enhances communication with the fishing sector and groups affected by the common fisheries policy	It relates to fisheries	
[128] European	Council Regulation (EC) No 104/2000 of 17 December 1999 (OJ L 017 , 21/01/2000 p. 0022-0052)		Under the Common Fisheries Policy (CFP), it establishes a common organisation of the markets in fishery and aquaculture products	It relates to fisheries	
[129] European	Directive 2000/60/EC (Water Framework Directive, WFD) (OJ L 327, 22/12/2000, p. 1-72)		It establishes a Community framework for water protection and management. Member States must identify and analyse European waters, on the basis of individual river basin and district. Then they shall then adopt management plans and programmes of	It relates to nature conservation, particularly to environmental protection	

			measures adapted to each body of water (including coastal waters). The overarching goal is to achieve "good ecological and chemical status" for all Community waters by 2015. Specific objectives: (1) preventing and reducing pollution; (2) promoting sustainable water usage; (3) environmental protection; (4) improving aquatic ecosystems ; and (5) mitigating the effects of floods and droughts		
[130] European	Council Decision 1999/802/EC of 22 October 1999 (OJ L 322, 14.12.1999, p. 32–33)		It consists on the acceptance of amendments to the Convention for the Protection of the Mediterranean Sea against Pollution and to the Protocol for the Prevention of Pollution by Dumping from Ships and Aircraft (Barcelona Convention)To reduce pollution in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	It relates to nature conservation, particularly environmental protection	
[131] European	Council Decision 1999/801/EC of 22 October 1999		It accepts the amendments to the Protocol for	It relates to nature conservation,	

	(OJ L 322, 14.12.1999, p. 18–31)		the protection of the Mediterranean Sea against pollution from land-based sources (Barcelona Convention). The aims are to reduce pollution from land-based sources in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	particularly environmental protection	
[132] European	Council Decision 1999/800/EC of 22 October 1999 (OJ L 322, 14.12.1999, p. 1–2)		It concludes (adopts as law) the Protocol concerning specially protected areas and biological diversity in the Mediterranean, and on accepting the annexes to that Protocol (Barcelona Convention). The aims are to halt and reverse biodiversity loss in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	It relates to nature protection	
[132b] European	Protocol concerning specially protected areas and biological diversity in the Mediterranean (OJ L 322,		The aims are (1) to protect, preserve and manage in a sustainable and environmentally sound way areas of particular	It relates to nature conservation	

	14.12.1999, p. 3–17)		natural or cultural value, notably by the establishment of specially protected areas (SPAs); (2) To protect, preserve and manage threatened or endangered species of flora and fauna. SPAs are aimed (2.1) to safeguard representative types of coastal and marine ecosystems of adequate size to ensure their long-term viability and to maintain their biological diversity; (2.2) to safeguard habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of distribution as a consequence of their regression or on account of their intrinsically restricted area; (2.3) to safeguard habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora or fauna; (2.4) to safeguard sites of particular importance because of their scientific, aesthetic, cultural		

			or educational interest		
[133] European	Commission Decision 1999/478/EC of 14 July 1999 (OJ L 187 , 20/07/1999, p. 0070-0073)		Under the Common Fisheries Policy (CFP), it renews the Advisory Committee on Fisheries and Aquaculture (notified under document number C(1999) 2042)	It relates to fisheries	
[134] European	Council Decision of 21 December 1998 (OJ L 358, 31.12.1998)		It concerns the approval, on behalf of the Community, of amendments to Appendices II and III to the Bern Convention on the conservation of European wildlife and natural habitats adopted at the 17th meeting of the Convention's Standing Committee. The aim is to promote cooperation between the signatory States in order to conserve wild flora and fauna and their natural habitats and to protect endangered migratory species	It relates to nature conservation	
[134b] European	Council Decision 98/416/EC of 16 June 1998 (OJ L 190, 04/07/1998 p. 34-35) as amended by Council Decision 2004/815/EC of 19 November 2004 (OJ L 357, 2 Dec 2004 p. 30)		Accession of the European Community to the General Fisheries Commission for the Mediterranean	It relates fisheries	
[134c] European	Council Decision 98/392/EC of 23		It concerns the conclusion by the	It relates to fisheries	

	March 1998 (OJ L 179, 23/06/1998 p. 1-2)		European Community of the United Nations Convention of 10 December 1982 on the Law of the Sea (UNCLOS) and the Agreement of 28 July 1994 relating to the implementation of Part XI thereof. The overarching goal is to conserve and manage the living resources of the high seas		
[134e] European	Council Directive 97/11/EC of 3 March 1997 (OJ L 73, 14/03/1997, p. 5-15)		It amends Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. The aim is to assess the environmental effects of those public and private projects which are likely to have significant effects on the environment	It relates to nature conservation, particularly environmental protection	
[134d] European	Council Regulation (EC) No 338/97 of 9 December 1996 (OJ L 061, 03/03/1997 p. 1-69)		It concerns the protection of species of wild fauna and flora by regulating trade therein. See [87]	It relates to nature conservation	
[134f] European	Council Decision 96/428/EC of 25 June 1996 (OJ L 177, 16/07/1996, p. 24-25)		It concerns the acceptance by the Community of the Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas	It relates to fisheries and nature conservation	

[135] European	Council Regulation (EC) No 1627/94 of 27 June 1994 (OJ L 171 , 06/07/1994 p. 0007-0013)		Under the Common Fisheries Policy (CFP), it lays down general provisions concerning special fishing permits	It relates to fisheries	
[136] European	Council Regulation (EC) No 1626/94 of 27 June 1994 (OJ L 171, 06/07/1994, p. 1–6)		It contains technical measures for the conservation of fishery resources in the Mediterranean	It relates to fisheries	
[137] European	Council Regulation (EEC) No 2847/93 of 12 October 1993 (OJ L 261 , 20/10/1993 p. 0001-0016)		Under the Common Fisheries Policy (CFP), it establishes a control, inspection and surveillance system applicable to the common fisheries policy	It relates to fisheries	
[137c] European	Council Decision 93/626/EEC of 25 October 1993 (OJ L 309, 13/12/1993, p. 1-2)		It concludes (adopt as law) the Convention on Biological Diversity. The aims are (1) the conservation of biological diversity; (2) sustainable use of its components; and (3) fair and equitable sharing of the benefits arising out of the utilization of genetic resources	It relates to nature conservation	
[137f] European	Council Regulation (EEC) No 3760/92 of 20 December 1992 (OJ L 389, 31.12.1992, p. 1–14)		It establishes a framework for the conservation and protection of fishing resources	It relates to fisheries sustainability	
[137d] European	Council Regulation (EEC) No 1973/92 of 21 May 1992 (OJ L 206, 22/07/1992,		It establishes a financial instrument for the environment (LIFE), to	It relates to nature conservation	

	p. 1-6) as amended by EC Regulation 1655/200		contribute to the implementation, development and enhancement of Community environmental policy and legislation		
[137e] European	Council Regulation (EEC) No 345/92 of 27 January 1992 (OJ L 42, 18.2.1992, p. 15–23)		It lays down certain technical measures for the conservation of fishery resources, amending for the eleventh time Regulation (EEC) No 3094/86 on the use and the length of driftnets (limited to 2.5 km) in EEC waters	It relates to fisheries and nature conservation	
[138] European	Directive 92/43/CEE (Habitats Directive) of 21 May 1992 (OJ L 206, 22 Jul 1992, p. 7-50)	European Council	Currently under the Biodiversity Strategy 2020, it concerns the conservation of habitats listed in Annex I, and wild fauna and flora species listed in Annex II, as well as any marine special protection areas established under the EC Birds Directive. The aims are (1) the conservation of habitats listed in Annex I; (2) the conservation of wild fauna and flora species listed in Annex II; and (3) the conservation of any marine special protection areas established under the EC Birds Directive	It relates to nature conservation	
[138b] European	Treaty establishing the European Community, consolidated text		Protection of the environment constitutes one of the essential objectives of the	It relates to nature conservation, particularly environmental	

	(OJ C 325, 24/12/2002, p. 1-331)		Community under the Treaty; in particular arts. 174 to 176 EC define the framework within which Community environmental policy must be carried out. Relevant aims are (1) preserving, protecting and improving the quality of the environment; (2) protecting human health; (3) prudent and rational utilisation of natural resources; and (4) promoting measures at international level to deal with regional or worldwide environmental problems	protection	
[138c] European	Council Regulation 563/91/EEC of 4 March 1991 (OJ L 332, 03/12/1991)		It concerns the Community Action for the Protection of the Environment in the Mediterranean (MEDSPA). Start date:1991-03-09; end date:1992-07-23. This programme is repealed by Council Regulation (EEC) No 1973/92 of 21.5.1992 establishing the LIFE financial instrument. The aims are (1) to intensify efforts to protect and improve the quality of the Mediterranean environment; (2)	It relates to nature conservation	

			to increase the effectiveness of Community environment policy and measures in the region; (3) to integrate cooperation and coordination at regional, national, Community and international level; (4) to encourage the transfer of appropriate technologies; (5) and to help make the environmental dimension a more integral part of Community policies		
[139] European	Council Decision 89/631/EEC of 27 November 1989 (OJ L 364 , 14/12/1989 p. 0064-0067)		Under the Common Fisheries Policy (CFP), it refers to a Community financial contribution towards expenditure incurred by Member States for the purpose of ensuring compliance with the Community system for the conservation and management of fishery resources	It relates to fisheries	
[140] European	Directive 85/337/EEC of 27 June 1985, as amended (Environmental Impact Assessment Directive, EIAD) (OJ NO. L 175 , 05 Jul 1985 p. 0040–0048)		It ensures that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval or authorisation. The aims are (1)	It relates to nature conservation	

			to provide a high level of protection of the environment; and (2) to reduce the environmental impact of projects, plans and programmes		
[140b] European	Council Directive 84/631/EEC of 6 December 1984 (OJ L 326, 13.12.1984, p. 31–41)		It concerns the supervision and control within the European Community of the transboundary shipment of hazardous waste. The aims are (1) the protection of human health; and (2) the protection of the environment	It relates to nature conservation, particularly environmental protection	
[141] European	Council Decision 84/132/EEC of 1 March 1984 (OJ L 68, 10.3.1984, p. 36–37)		It concludes (adopts as law) the Protocol concerning Mediterranean specially protected areas. The aims are to safeguard: (1) representative types of coastal and marine ecosystems of adequate size to ensure their long-term viability and to maintain their biological diversity; (2) habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of distribution as a consequence of their regression or on account of their intrinsically	It relates to nature conservation	

			restricted area; (3) habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora or fauna; and (4) sites of particular importance because of their scientific, aesthetic, cultural or educational interest		
[141b] European	Commission Regulation (EEC) No 3418/83 of 28 November 1983 (OJ L 344, 07/12/1983 p. 1-27)		It lays down provisions for the uniform issue and use of the documents required for the implementation in the Community of the Convention on international trade in endangered species of wild fauna and flora. See [87]	It relates to nature conservation	
[142] European	Council Decision 83/101/EEC of 28 February 1983 (OJ L 67, 12.3.1983, p. 1–2)		It concludes (adopts as law) the Protocol for the protection of the Mediterranean Sea against pollution from land-based sources. The aim is to reduce pollution from land-based sources in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	It relates to nature conservation, particularly environmental protection	

[142b] European	Council Regulation (EEC) No 3626/82 of 3 December 1982 (OJ L 384, 31/12/1982, p. 1-61)		It concerns the implementation in the Community of the Convention on international trade in endangered species of wild fauna and flora. See [87]	It relates to nature conservation	
[142c] European	Council Decision 82/461/EEC of 24 June 1982 (OJ L 210, 19/07/1982 p. 10-22)		It concerns the conclusion (adoption as law) of the Convention on the conservation of migratory species of wild animals. See [87]	It relates to nature conservation	
[143b] European	Council Decision 81/971/EEC of 3 December 1981 (OJ L 355, 10.12.1981, p. 52–55)		It establishes a Community information system for the control and reduction of pollution caused by hydrocarbons discharged at sea	It relates to nature conservation, especially environmental protection	
[144] European	Council Decision 81/420/EEC of 19 May 1981 (OJ L 162, 19.6.1981, p. 4–13)		It concludes (adopts as law) the Protocol concerning cooperation in combating pollution of the Mediterranean Sea by oil and other harmful substances in cases of emergency. The aim is to reduce pollution in the Mediterranean Sea and protect and improve the marine environment in the area, thereby contributing to its sustainable development	It relates to nature conservation, particularly environmental protection	
[144b] European	Council Regulation (EEC) No 348/81 of 20 January 1981		It requires a licence for imports of whale parts and	It relates to nature conservation, in particular	

	(Cetaceans) (OJ L 39, 12.2.1981, p. 1–3)		products and prohibited the issue of such a licence for products used for commercial purposes after January 1982	the protection of cetaceans	
[145] European	Council declaration of 30 May 1980 (OJ C 158 , 27/06/1980 p. 0002-0002)		It concerns the Common Fisheries Policy (CFP). The objectives of CFP are: (1) protection of stocks against over-fishing; (2) guaranteed incomes for fishermen; (3) regular supply at reasonable prices for consumers and the processing industry; and (4) sustainable biological, environmental and economic exploitation of living aquatic resources	It relates to fisheries	
[143] European	Council Decision 82/72/EEC of 3 December 1981 (Convention on the Conservation of European Wildlife and Natural Habitats, Bern Convention of 19 September 1979) in force since 1 June 1982 (OJ L 38, 10.02.1982, p. 1-2)		It concerns the conclusion (adoption as law) by the Community of the Bern Convention on the Convention on the Conservation of European Wildlife and Natural Habitats. The overarching goal is to ensure the conservation of European wildlife and natural habitats by means of cooperation between States. The aims are (1) the conservation of wild flora and	It relates to nature conservation	

			fauna, and their natural habitats; (2) to plan and develop policies, and measures against pollution; (3) education and dissemination of general information on the need to conserve species of wild flora and fauna and their habitats; (4) co-ordination of research related to the purposes of the Convention; (5)international co-operation to enhance the effectiveness of these measures		
[146] European	Directive 79/409/CEE (Conservation of wild birds) of 2 Apr 1979 (OJ L 103, 25/04/1979 p. 1-18)	European Council	It establishes protection zones for birds, as well as the maintenance of their habitats, the restoration of lost biotopes, and the generation of biotopes	It relates to nature conservation	
[147] European	Council Decision 77/585/EEC of 25 July 1977 (OJ L 240, 19.9.1977, p. 1–2)		It concludes (adopts as law) the Convention for the protection of the Mediterranean Sea against pollution and the Protocol for the prevention of the pollution of the Mediterranean Sea by dumping from ships and aircraft. The aim is to reduce pollution in the Mediterranean Sea and protect and improve the marine environment in	It relates to nature conservation, particularly environmental protection	

			the area, thereby contributing to its sustainable development		
[147b] European	Council Directive 76/464/EEC of 4 May 1976 (OJ L 129, 18.5.1976, p. 23–29)		It concerns pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. Introduces the concept of list I and list II substances. The purpose is to eliminate pollution from list I substances and to reduce pollution from list II substances. The aim is to regulate potential aquatic pollution chemicals produced in Europe, including coastal waters	It relates to nature conservation, particularly environmental protection	
[147c] European	Council Directive 76/160/EEC of 8 December 1975 (OJ L 031 , 05/02/1976 p. 1-7)		It concerns the quality of bathing water. The aims are (1) to reduce the pollution of bathing water; and (2) to protect such water against further deterioration	It relates to nature conservation, particularly environmental protection	
[148] National: Italy	Decree (DM) no. 10988 of 6 Dec 2010		It establishes the monitoring of leisure fishing. It concludes (adopts as law) the Council Regulation (EC) No. 1967/2006 of 21 Dec 2006	It relates to fisheries.	
[149] National: Italy	Decree (DL) no. 128 of 20 June 2010	Italian Ministry for the Environment, Regional authorities	It concerns conservation issues related to oil exploitation. Defines environmental	It relates to nature conservation, particularly environmental protection	

			conservation as goal of the State; introduces sustainable development as an objective for environmental conservation; recall for taking into account international law; regulates Environmental Impact Assessment, Integrated IA and Strategic IA; defines limits for public consultation, diffusion and participation; establish the Italian Ministry of the Environment as authority regarding off-shore platforms. The aims are (1) the environmental conservation in the face of oil exploitation; and (2) sustainable development. See [99; 151; 152; 168; 206; 213; 214]		
[150] National: Italy	Decree (DM) no. 715 of 1 Jun 2010 (GU n. 145 of 23 Jun 2010)	Ministry of the environment	It contains executive regulations of the Egadi MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	Yes
[151] National: Italy	Decree (DM) 29 March 2010	Ministry of economic	It expands the boundaries of	It relates to nature	

		development – Department of energy – general direction for mineral and energetic resources	the Zone G in the Italian continental shelf off southern Sicily. The aim is to extend the area of sea bottom where Italian and European policies about environmental protection from oil apply. See [99; 149; 152; 168; 206; 213; 214]	conservation, particularly environmental protection	
[152] National: Italy	Law no. 69 (art. 12) of 18 June 2009	Ministry of the environment	It contains conservation issues related to oil exploitation. The aim is to extend the area of sea bottom where Italian and European policies about environmental protection from oil apply. See [99; 149; 151; 168; 206; 213; 214]	It relates to nature conservation, particularly environmental protection	
[153] National: Italy	Decree of 30 Mar 2009 (GU no. 95 of 24 Apr 2009 ordinary suppl. no. 61)	Ministry of the environment and the protection of the territory and the sea	It contains the second list of the SACs for the Mediterranean biogeographic region in Italy, carrying into effect the Directive 92/43/CEE. See [138]	Nature conservation	
[154] National: Italy	Decree of 22 Jan 2009 (GU no. 33 of 10 Feb 2009)	Ministry of the environment and the protection of the territory and the sea	It carries a modification of the Decree 17 Oct 2007 on the minimum standards for the definition of SACs and SPAs. See [138]	It relates to nature conservation	
[155] National: Italy	Decree of 3 Jul 2008 (GU no. 184 of 7 Aug 2008)	Ministry of the environment and the protection of the territory and the sea	It contains the first list of the SACs for the Mediterranean biogeographic region in Italy,	It relates to nature conservation	

			carrying into effect the Directive 92/43/CEE See [138]		
[156] National: Italy	Resolution of 26 Mar 2008 (GU no. 137 of 13 Jun 2008)	Permanent conference of the relationships between the State and the regions and the autonomous provinces of Trento and Bolzano	It carries a modification of the resolution of 2 Dec 1996 of the Ministry of the environment on the classification of protected areas. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[157] National: Italy	Communication (GU no. 68 of 20 Mar 2008)	Ministry of the environment and protection of the territory and the sea	It is a notification of a government issue dedicated to the managers of the MPAs (and other protected areas as defined in the L. 394/1991 and the fifth update of the list of protected areas) for the realization of projects on the use of “green” energy within protected areas, carrying into effect the DM no. 94 of 22 Feb 2008. The aim is (1)the use of removable energies within MPAs	It relates to nature conservation, particularly environmental protection	
[158] National: Italy	Communication (GU no. 61 of 12 Mar 2008)	Ministry of the environment and protection of the territory and the sea	It is a notification of a government issue dedicated to municipalities of minor islands	It relates to nature conservation	

			holding MPAs (both projected or in act) as well as municipalities in any other type of protected areas that extend over the sea. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]		
[159] National: Italy	Decree (DM) no. 85 of 4 Feb 2008 (GU n. 129 of 4 Jun 2008)	Ministry of the environment and protection of the territory and the sea	It contains executive regulations of the Pelagie MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[160] National: Italy	Decree 17 Oct 2007 (GU no. 258 of 6 Nov 2007)	Ministry of the environment and protection of the territory and the sea	It contains standard criteria for the definition of the conservation measures to apply in SACs and SPAs. See [138; 146]	It relates to nature conservation	
[161] National: Italy	Decree 5 Jul 2007 (GU no. 170 of 24 Jul 2007 ordinary suppl. no. 167)	Ministry of the environment and protection of the territory and the sea	It contains a list of the Italian SACs for the Mediterranean Biogeographic area. It carries into act the Directive 92/43/CEE. See [138]	It relates to nature conservation	
[162] National:	Decree 5 Jul 2007	Ministry of the	It contains a list of	It relates to	

Italy	(GU no. 170 of 24 Jul 2007 ordinary suppl. no. 167)	environment and protection of the territory and the sea	the Italian SPAs for the Mediterranean Biogeographic area. It carries into act the Directive 79/409/CEE. See [146]	nature conservation	
[163] National: Italy	Government issue - Communication	Ministry of Justice	It calls attention on the lack of turning of the Decree (DL) no. 251 of 16 Aug 2006 into law. See [146]	It relates to nature conservation	
[164] National: Italy	Decree (DL) no. 251 of 16 Aug 2006		It contains urgent dispositions to ensure the alignment of the national law to the European Directive 79/409/CEE for the conservation of the wild fauna. It helps transposition of the European Directive 79/409/CEE (Conservation of wild birds) of 2 Apr 1979. See [146]	It relates to nature conservation	
[165] National: Italy	Law no. 248 of 4 Aug 2006		It converts into law (after modifications) of the DL no. 223 of 4 Jul 2006, which in art. 22 determines a reduction of 10% of the funds dedicated to the management bodies of protected areas	It relates to nature conservation	
[166] National: Italy	Law no. 61 of 8 Feb 2006 (GU no. 52 of 3 Mar 2006)		It establishes zones of ecological protection off the territorial seas. The aims are (1) the environmental	It relates to nature conservation and fisheries sustainability	

			conservation in the international high seas; (2) the sustainable fisheries in the international high seas		
[167] National: Italy	Decree (DL) no. 203 of 30 Sep 2005 (GU no. 230 of 3 Oct 2005) coordinated with conversion Law no. 248 of 2 Dec 2005 (GU no. 281 of 2 Dec 2005 ordinary suppl. no. 195)		It contains provisions against fiscal evasion as well as urgent financial measures. Art 11 contains modifies to L no. 394 of 6 Dec 1991 about the framework for the establishment and management of natural reserves. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[168] National: Italy	Agreement of 14 Jul 2005 (GU no. 174 of 28 Jul 2005 inventory no. 863/CU)		It is an agreement (as stated in L. 5 Jun 2003 art 8) on the concession of maritime State properties and zones of sea within MPAs. See [99; 149; 151; 152; 206; 213; 214]	It relates to nature conservation	
[170] National: Italy	Decree of 25 Mar 2005 (GU no. 168 of 21 Jul 2005)	Ministry of the environment and protection of the territory and the sea	It contains a list of the Italian SPAs for the Mediterranean Biogeographic area to carry into act the Directive 79/409/CEE (Conservation of wild birds) of 2 Apr 1979.	It relates to nature conservation	

			Transposition of the Directive 79/409/EEC: Conservation of birds and their habitats. See [146]		
[169] National: Italy	Decree of 25 Mar 2005 (GU no. 157 of 8 Jul 2005)	Ministry of the environment and protection of the territory and the sea	Transposition of the Directive 92/43/EEC (Habitats Directive) of 21 May 1992. It contains the list of the Italian proposed SACs for the Mediterranean Biogeographic area to carry into act the Directive 92/43/CEE. See [138]	It relates to nature conservation	
[171] National: Italy	Decree 25 Mar 2005 (GU no. 155 of 6 Jul 2005)	Ministry of the environment and protection of the territory and the sea	It makes null the communication of the Commission for the natural protected areas of 2 Dec 1996 (published GU no. 139 of 17 Jun 1997): management and conservation of SACs and SPAs. See [138; 146]	It relates to nature conservation	
[172] National: Italy	Measure of 24 Jul 2003 (GU no. 205 of 4 Sep 2003 ordinary suppl. no. 144)	Permanent conference for the relationships between the State and the regions and the autonomous provinces of Trento and Bolzano	It contains the fifth update of the official list of protected areas, in line with L. no. 394 of 6 Dec 1991 (art. 3) and D.L. no. 281 of 28 Aug 1997 (art 7). (1) Conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	

[173] National: Italy	Decree (DPR) no. 120 of 12 Mar 2003 (GU no. 124 of 30 May 2003)		It modifies DPR no. 357 of 8 Sep 1997 (GU no. 284 of 23 Oct 1997 ordinary suppl. no. 219/L). Regulations that carry into effect the Directive 92/43/EEC (Habitats Directive) of 21 May 1992. The Sicilian Region is charged to designate sites (special protection zones and special conservation zones) of the Natura 2000 network, as well as to apply conservation and protection measures, including sectoral or integrated management plans. See [138; 146]	It relates to nature conservation	
[175] National: Italy	Resolution of 28 Nov 2002 (GU no. 294 of 16 Dec 2002)	Permanent conference for the relationships between the State and the regions and the autonomous provinces of Trento and Bolzano	It adopts the amendment to the forth update of the official list of natural protected areas, approved by the Conference on 25 Jul 2002 in line with L. no. 394 of 6 Dec 1991 (art. 3) and DL no. 281 of 28 Aug 1997 (art. 7). The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See	It relates to nature conservation	

			[138; 146]		
[174] National: Italy	Decree (DM) of 21 Oct 2002 (GU n. 14 of 18 Jan 2003)	Ministry of the environment and protection of the territory and the sea	It establishes the Pelagie MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[176] National: Italy	Decree (DM) of 3 Sep 2002	Ministry of the environment and protection of the territory	It contains the framework of main principles for the management of the sites within the Natura 2000 network (which incorporates the Birds Directive and the Habitats Directive). It transposes the Directive 92/43/EEC (Habitats Directive) of 21 May 1992. See [138; 146]	It relates to nature conservation	
[177] National: Italy	Law no. 179 of 31 Jul 2002 (GU no. 189 of 13 Aug 2002)		It allows for changes in the organization of the management bodies of MPAs and institution of a dedicated environmental branch within the Coast Guard, among many other heterogeneous issues	It relates to nature conservation	
[178] National: Italy	Resolution no. 1500 of 25 Jul 2002 (GU no. 214 of 12 Sep 2002 ordinary suppl. no. 183)	Permanent conference for the relationships between the State and the regions and the autonomous provinces of	It approves the forth list of natural protected areas, approved by the Conference on 25 Jul 2002 in line with L. no. 394 of	It relates to nature conservation	

		Trento and Bolzano	6 Dec 1991 (art. 3) and DL no. 281 of 28 Aug 1997 (art. 7). The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]		
[179] National: Italy	Government issue - Communication (GU no. 156 of 5 Jul 2002)	Ministry of the environment and protection of the territory	It calls for applications for public contributions to fund projects aimed to develop removable energies, energy efficiency and sustainable mobility within Italian protected areas. The aims are (1) the use of removable energies; (2) energy efficiency; (3) and sustainable mobility within MPAs	It relates to nature conservation, particularly environmental protection	
[180] National: Italy	Decree (DD) no. 982 of 21 Dec 2001 (GU no. 91 of 18 Apr 2002)	Ministry of the environment and protection of the territory	It contains a plan for the diffusion of removable energies, energy efficiency and sustainable mobility within protected areas. The aims are (1) the use of removable energies; (2) energy efficiency; (3) and sustainable mobility within MPAs	It relates to nature conservation, particularly environmental protection	
[181] National: Italy	Decree (DL) no. 226 of 18 May		It establishes the orientation and	It relates to fisheries	

	2001 (GU no. 137 of 15 Jun 2001, Suppl. Ord. no. 149)		modernization of the fisheries and aquaculture sectors, in line with L no. 57 of 5 Mar 2001 (art 5). The aims are (1) the establishment of management units that are homogeneous from ecological, social and economical points of view; (2) to promote sustainable ways of fisheries exploitation; (3) to increase job opportunities; (4) to conclude the Regulations CEE 4028/86 and CEE n. 2080/93 on the decrease of fishing capacity within 30 Jun 2002; and (5) to facilitate access to credit of the fisheries sector		
[184] National: Italy	Decree of 3 Apr 2000 (GU no. 95 of 22 Apr 200 ordinary suppl. no. 65)		It contains a list of the SACs and SPAs. It transposes the Directives 92/43/CEE and 79/409/CEE. See [138; 146]	It relates to nature conservation	
[187] National: Italy	Decree (DL) no. 112 of 31 Mar 1998 (GU no. 92 of 21 Apr 1998, Suppl. Ord. no. 77, corrected by GU no. 116 of 21 May 1997 and updated by and coordinated with Decree (DL) no. 343 of 7 Sep 2001		It establishes the passage of competences and administrative functions from the State to the Regions and other local bodies, to carry into effect the L. no. 57 of 15 Mar 1997. The local (Sicilian) government is charged with competences to produce	It relates to nature conservation	

			management plans regarding nature conservation, environmental protection, water quality and preservation of the natural heritage (except for national parks and reserves)		
[182] National: Italy	Law no. 93 of 23 Mar 2001 (GU no. 79 of 4 Apr 2001)		It updates L. no. 426 of 9 Dec 1998. The aims are (1) the establishment of a standard for environmental surveys; (2) to ensure the development of regional agencies for the environment; (3) to update the equipments of environmental laboratories; and (4) to coordinate the environmental information system with the geological information system to produce hydrological risk maps	It relates to nature conservation, particularly environmental protection	
[183] National: Italy	Law no. 57 of 5 Mar 2001 (GU no. 66 of 20 Mar 2001)		It contains provisions on the fisheries and other sectors. The aims are (1) to promote the social and economic development of fisheries ensuring the protection of nature, biodiversity and cultural heritage; (2) to develop marine resources including	It relates to fisheries and nature conservation, particularly environmental protection	

			management and protection of the environment, including new economic incomes; (3) to update fishing structures and techniques with low environmental impact, keeping pace with market demand and the protection of the consumer and the environment; (4) to enhance environmental protection; and (5) to promote job occupation in the fisheries sector		
[188] National: Italy	Decree (DL) no. 490 of 29 Oct 1999		It contains an update of and coordination with L no. 431 of 8 Aug 1985 (aka Galasso law) about urgent measures for the protection of areas of particularly high environmental value. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[188c] National: Italy	Decree (DM) 14 Sep 1999 (GU n. 31 del 8 Feb 2000)		It concerns the regulation of artisanal fishing. The aim is to subsidize the artisanal fishing fleet (within 12 nm from the coastline)	It relates to fisheries	

[188b] National: Italy	Decree (DM) no. 293 of 13 Apr 1999 (GU no. 197 of 23 Aug 199) in force since 7 Sep 1999		It contains regulations on touristic fishing, carrying into effect art. 27bis of L no. 41 of 17 Feb 1982 as amended. See [185e]	It relates to fisheries	
[185] National: Italy	Decree (DM) of 20 Jan 1999		It modifies Annexes I and II in the transposition of the European Directive no. 92/43/CEE (Habitats Directive) of 21 May 1992. See [138]	It relates to nature conservation	
[186] National: Italy	Law no. 426 of 9 Dec 1998 (GU no. 291 of 14 Dec 1998), updated by and coordinated with Law no. 93 of 23 Mar 2001		The aims are (1) the institution of a technical department for the establishment and update of MPAs within the Ministry of the Environment ; (2) institution of a national program on *Posidonia oceanica* of 3 years; and (3) management of MPAs endorsed to public entities, research institutions and environmental associations	It relates to nature conservation, particularly environmental protection	
[185b] National: Italy	Decree (DPR) no. 445/1998 of 19 Nov 1998 (GU no. 299 of 23 Dec 1998)		It contains regulations on administrative details in the fisheries sector. The aim is to simplify administrative issues regarding fisheries	It relates to fisheries	
[185d] National: Italy	Decree (DM) of 14 Oct 1998 (GU no. 281 of 1 Dec 1998)		It contains technical issues for the “ferrettara” gear (a particular type of drifting net for	It relates to fisheries	

			small pelagic fishes). The aim is to regulate and limit the use of a particular type of drifting net for small pelagic fishes		
[185c] National: Italy	Decree (DM) of 27 Jul 1998 (GU no. 232 of 5 Oct 1998)		It concerns the use of the "totanara" gear. The aim is to regulate and limit the use of a particular type of gear for squid *Todarodes sagittatus*	It relates to fisheries	
[189] National: Italy	Law no. 164 of 21 May 1998 (GU no. 124 of 30 May 1998)		It contains measures about fishing and aquaculture. The aim is to subsidize the fisheries sector during the 1998-2000 period	It regards fisheries	
[189b] National: Italy	Decree (DM) 16 Jun 1998 (GU no. 156 of 7 Jun 1998)		It contains regulations to carry into effect short-term stop of fishing activities for trawlers and purse-seiners during 1998. The aim is to achieve a temporal reduction of fishing effort in trawlers and purse-seiners during 1998	It relates to fisheries	
[185e] National: Italy	Decree (DM) no. 293 of 13 Apr 1998 (GU no. 131 of 8 Jun 1998)		It modifies decree (DM) of 19 Jun 1992 on regulations to carry into effect L no. 41 of 17 Feb 1982 about touristic fishing. The aim is to regulate touristic fishing	It relates to fisheries	
[190] National: Italy	Decree (DPR) no. 357 of 8 Sep 1997 (GU no. 284		It contains regulations that carry into effect	It relates to nature conservation	

	of 23 Oct 1997 ordinary suppl. no. 219/L) coordinated with Decree (DPR) no. 120 of 12 Mar 2003 (GU no. 124 of 30 May 2003)		the European Directives no. 92/43/CEE (Habitats Directive) and no. 79/409/CEE (conservation of wild birds). See [138; 146]		
[191] National: Italy	Decree (DL) no. 281 of 28 Aug 1997		It establishes the suppression of the Commission for the natural protected areas, whose attributions are passed to the Permanent Conference for the relationships between State, the Regions and the autonomous Provinces of Trento and Bolzano. Transposition of the Directive 92/43/EEC (Habitats Directive) of 21 May 1992: Definition of the competent body for conservation of natural habitats and of wild fauna and flora. See [138]	It relates to nature conservation	
[191b] National: Italy	Decree (DM) of 31 July 1997 (GU no. 237 of 10 Oct 1997)		It concerns to fishing licenses. Establishes a process to authorize or deny the existing fishing gears and places the Ministry to establish a framework of regulations within 31 Jan 1998	It relates to fisheries	
[192] National: Italy	Decree (DL) no. 143 of 4 Jun 1997 (GU no. 129 of 5 Jun 1997)		It establishes the passage of administrative functions in	It relates to fisheries	

			agriculture and fisheries from the State to the Regions, as well as reorganization of the central administration. The aim is to move administrative powers in fisheries from the central government to local ones (Sicily)		
[193] National: Italy	Communication of the Commission for the natural protected areas of 2 Dec 1996 (published GU no. 139 of 17 Jun 1997)		It includes both zones of special protection and zones of special conservation as types of protected areas. It represents the transposition of the Directive 92/43/EEC (Habitats Directive) of 21 May 1992: Definition of the competent body for conservation of natural habitats and of wild fauna and flora. See [138]	It relates to nature conservation	
[193b] National: Italy	Decree (DM) of 28 Aug 1996 (GU no. 237 of 9 Oct 1996)		It regulates fisheries of the fish-fry and transparent goby (*Aphia minuta*). The aim is to authorize, regulate and limit the fisheries of fish-fry and transparent goby (*Aphia minuta*)	It relates to fisheries	
[194] National: Italy	Decree (DM) of 17 May 1996 (GU no. 263 of 9 Nov 1996)	Ministry of the environment	It modifies the Egadi MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3)	It relates to nature conservation	Yes

			species protection; (4) environmental education and research. See [138; 146]		
[195] National: Italy	Decree (DM) 26 Jul 1995 (GU no. 203 of 31 Aug 1995)		It contains regulations for the release of the fishing license. The aim are (1) to limit fishing effort; (2) to regulate authorized fishing gears; (3) to diversify fishing effort; (4) to promote the passage from trawling to other fishing methods; (5) to apply Regs. CEE 2930/86 and CEE 2104/93	It relates to fisheries	
[196] National: Italy	Decree (DM) of 15 Jun 1995 (GU no. 209 of 7 Sep 1995)	Ministry of the environment	It makes null the D.M. of 26.07.1994 (G.U. n. 180 of 03.08.1994). See [138; 146]	It relates to nature conservation	No
[197] National: Italy	Decree (DM) of 26 Jul 1994 (GU no. 180 of 3 Aug 1994)	Ministry of the environment	It contains the modification of the Egadi MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	Yes
[198] National: Italy	Law no. 124 of 14 Feb 1994		It represents the ratification and fulfilment of the Biodiversity Convention, with annexes, of Rio de Janeiro on 5 Jul 1992. [See 96]	It relates to nature conservation	
[199] National:	Decree (DM) of 6	Ministry of the	It contains a	It relates to	Yes

Italy	Aug 1993 (GU no. 199 of 25 Aug 1993	environment	modification of the Egadi MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	nature conservation	
[200] National: Italy	Law 381 of 25 Aug 1992 (GU no. 205 of 1 Sep 1988)		It contains modifications to the L no. 963 of 14 Jul 1965 about regulations for maritime fishing. See [212; 216]	It relates to fishing	
[200b] National: Italy	Decree (DM) of 19 Jun 1992 (GU no. 120 of 27 Jun 1992)		It contains regulations for putting into effect art. 27bis of L no. 41 of 17 Feb 1982 on touristic fishing. See [212]	It relates to fishing	
[201] National: Italy	Law no. 165 of 10 Feb 1992 (GU no. 48 of 27 Feb 1992)		It contains modifications and supplements to the L no. 41 of 17 Feb 1982 about the plan for rationalization and development of maritime fishing. See [212]	It relates to fishing	
[202] National: Italy	Law no. 157 of 11 Feb 1992 (GU no. 46 of 25 Feb 1992 ordinary suppl. no. 41) updated by the Communication of the Ministry of Justice (GU no. 243 of 18 Oct 2006)		It regulates hunting and contains some protection measures for homeothermic species. It partially transposes the European Directive 79/409/CEE (Conservation of wild birds) of 2 Apr 1979. See [146]	It relates to nature conservation	
[203] National: Italy	Decree (DI) of 27 Dec 1991	Ministry of the environment	It establishes the Egadi MPA. It	It relates to nature	

			relates to (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	conservation	
[204] National: Italy	Law no. 394 of 6 Dec 1991 (GU of 13 Dec 1991 ordinary suppl. no. 292) coordinated with Law 426 of 9 Dec 1998 and Law no. 93 of 23 Mar 2001		It contains the framework for the establishment and management of natural reserves; also establish the Commission for the natural protected areas. It transposes the European Directive 79/409/CEE (Conservation of wild birds) of 2 Apr 1979. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]. See [146]	It relates to nature conservation	
[205] National: Italy	Decree (DM) 10 May 1991 (GU no. 136 of 12 Jun 1991)		It establishes the registry of Italian protected areas. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	

[206] National: Italy	Law no. 9 (art. 4) of 9 January 1991	Ministry of economic development – Department of energy – general direction for mineral and energetic resources; Ministry of the environment	It prohibits extractive activities within 12 nm from the shorelines of the Egadi Islands. The aim is the environmental protection from oil extraction. See [99; 149; 151; 152; 168; 213; 214]	It relates to nature conservation	
[206b] National: Italy	Law no. 381 of 25 Aug 1988 (GU no. 205 of 1 Sep 1988)		It contains modifications to the law 963 of 14 Jul 1965 on regulation of maritime fishing. The aims are (1) the establishment of the division of the fishing areas in homogeneous management subareas (districts); (2) promotion of educational courses for fishermen on new technologies, aquaculture and environmental issues; and (3) enumerates a number of prohibited fishing behaviours. See also [216]	It relates to fishing	
[207] National: Italy	Decree (DM) no. 250 of 5 Jun 1987 (GU no. 149 of 29 Jun 1987)		Its supplements art. 87 of the DPR no. 1639 of 2 Oct 1968, which approves the regulations that carry into effect the L no. 963 of 14 Jul 1965, about maritime fisheries. See [216]	It regards fisheries	
[207b] National: Italy	Decree (DM) of 20 Oct 1986 (GU no. 280 of 2 Dec 1986)		It contains regulations for professional underwater	It relates to fisheries	

			fishing		
[208] National: Italy	Law no. 431 of 8 Aug 1985 (aka Galasso law) (GU no. 197 of 22 Aug 1985) updated by and coordinated with Decree (DL) no. 490 of 29 Oct 1999		It converts into law, with modifications, of the DL no. 312 of 27 Jun 1985, about urgent dispositions for the protection of areas of particularly high environmental value. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[209] National: Italy	Decree (DM) 21 Apr 1983 (GU no. 116 of 29 Apr 1983)		It contains modifications to the regulations that carry into effect the L no. 963 of 14 Jul 1965 about maritime fisheries. See [216]	It relates to fisheries	
[209b] National: Italy	Decree (DPR) no. 219/1983 of 18 Mar 1983 (GU no. 143 of 26 May 1983)		It modifies regulation of maritime fishing approved by decree (DPR) no. 1639/1968 of 2 Oct 1968	It relates to fisheries.	
[210] National: Italy	Law no. 979 (art. 31) of 31 Dec 1982 (GU no. 16 of 18 Jan 1983 ordinary suppl.)	Ministry of the environment	It contains provisions for the defence of the sea. Art. 31 identifies the Egadi MPA and Pelagie MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4)	It relates to nature conservation	Yes

			environmental education and research. See [138; 146]		
[210b] National: Italy	Decree (DM) of 6 Aug 1982 (GU no. 230 of 21 Aug 1982)		It modifies the art. 2 of the decree (DM) of 7 Jan 1980 on underwater fishing	It relates to fishing	
[211] National: Italy	Decree (DM) of 3 Aug 1982 (GU no. 230 of 21 Aug 1982)		It supplements the DPR no. 1639 of 2 Oct 1968 (art. 87) about the minimum catchable length for *Solea vulgaris*, *Merluccius merluccius* and *Mullus* sp.	It relates to fishing	
[212] National: Italy	Law no. 41 of 17 Feb 1982 (GU no. 73 of 17 Feb 1982) modified and supplemented by Law 165 of 10 Feb 1992		It contains a plan for rationalization and development of maritime fishing. The aims are (1) the establishment of a national fisheries plan; (2) Rational management of maritime biological resources; (3) increase of biological productivity and value of massively fished species; (4) diversification of the demand, rationalization of the market and increase of consumes; (5) increase of the value of fishing products; (6) enhancement of the fishermen's welfare and working conditions; enhancement of the commercial balance of the	It relates to fishing	

			sector		
[212b] National: Italy	Decree (DM) of 7 Jan 1980 (GU no. 11 of 12 Jan 1980)		It e stablishes the registration of fishermen and establishes the regulations for underwater fishing	It relates to fisheries	
[213] National: Italy	Decree (DI) of 26 Jun 1981	Ministry of economic development – Department of energy – general direction for mineral and energetic resources	It defines the boundaries of the Zone G in the Italian continental shelf off southern Sicily. It defines the area of sea bottom where Italian and European policies apply. See [99; 149; 151; 152; 168; 206; 214]	It relates nature conservation	
[214] National: Italy	Law no. 347 of 3 June 1978	Ministry of economic development – Department of energy – general direction for mineral and energetic resources	It executes the Italy-Tunisia bilateral agreement on the sovereignty of the continental shelf. It defines the area of sea bottom where Italian and European policies apply. See [99; 149; 151; 152; 168; 206; 213]	It relates to nature conservation and fisheries	
[215] National: Italy	Decree (DPR) no. 1639 of 2 Oct 1968 supplemented by DM of 3 Aug 1982 (GU no. 230 of 21 Aug 1982)		It contain regulations to carry into effect the L no. 963 of 14 July 1965 about maritime fishing. See [216]	It relates to fishing	
[216] National: Italy	Law no. 963 of 14 Jul 1965 (GU no. 203 of 14 Aug 1965) carried into effect by DPR no. 1639 of 2 Oct 1968 supplemented by DM of 3 Aug 1982		It contains a general framework of regulations for maritime fishing	It regards to fishing	
[217] Local: Sicily	Decree (DA) no. 221 of 31 Dec 2010	Regional office of the territory and the environment	It establishes the Egadi and Pelagie marine SACs [albeit maps and management	It regards nature conservation	Yes (in correspondence with the boundaries of the MPAs)

			plans NA yet]. Makes the regulations of the Natura 2000 network executive in the Egadi and Pelagie SACs. See [138; 146]		
[218] Local: Sicily	Law (LR) no. 13 of 8 May 2007 (GURS no. 22 of 11 May 2007)		It promotes of economic activities within SACs and SPAs. Regulations on popular and cooperative building. It contains measures on the tourism sector, as well as modifications to the LR no. 10 of 2007. The aims are the promotion of economic activities within SACs and SPAs	It relates to nature conservation	
[219] Local: Sicily	Decree (Decreto Assessoriale) of 3 Apr 2007	Regional office of the territory and the environment	It transposes the European directives no. 79/409/CEE & no. 92/43/CEE. Extension of the Italian DPR no. 357/97 to include SPAs and SACs as areas subjected to protection. List of the SACs and SPZs within the Sicilian territory. See [138; 146]	It relates to nature conservation	Yes
[220] Local: Sicily	Decree (Decreto Assessoriale) of 21 Feb 2005 (GURS no. 42 of 7 Oct 2005)	Regional office of the territory and the environment	It contains the summary of SACs and SPAs: Egadi MPA; and Linosa, Pantelleria and Lampedusa islands within the study area. It transposes European directives no. 79/409/CEE & no.	It relates to nature conservation	

			92/43/CEE. See [138; 146]		
[221] Local: Sicily	Decree (DD) of 23 Jan 2004 (GU no. 58 of 10 Mar 2004)		It establishes a temporal ban of modifiability relative to the Egadi Islands, ex art. 5 of LR no. 15 of 1991. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[222] Local: Sicily 2003	Decree 20 Mar 2003 (GU no. 110 of 14 May 2003)		It contains an extension of the temporal ban of modifiability relative to the Egadi Islands. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[223] Local: Sicily	(GURS no. 57 15 Dec 2000)		It contains a list of the SACs and SPAs, in line with Directives 92/43/CEE and 79/409/CEE. See [138; 146]	It relates to nature conservation	
[224] Local: Sicily	Law (LR) no. 32 of 23 Dec 2000 (GURS no. 61 of 23 Dec 2000)		It contains provisions to carry into effect the National Operative Plan 2000-2006 and for the reorganization of the system of financial aids to	It relates to fisheries	

			companies. The aim is to carry into effect the Reg. CE 1260/1998		
[225] Local: Sicily	Decree 18 Apr 2000		It establishes the Linosa and Lampione MPA. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[226] Local: Sicily	Decree 3 April 2000 (GURI no. 95 of 22 Apr 2000 ordinary suppl. no. 65)		It contains the list of the SACs and SPAs, in line with Directives 92/43/CEE and 79/409/CEE. See [138; 146]	It relates to nature conservation	
[227] Local: Sicily	Decree of 30 Dec 1999	Regional office of the territory	It updates the L.R. no. 98 of 6 May 1981: Regulations for the establishment of natural reserves. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[228] Local: Sicily	Law (LR) no. 10 of 27 Apr 1999		It updates LR no. 71 of 3 Oct 1995: Urgent dispositions about territory and environment. The aims are (1) the conservation of natural and cultural heritage;	It relates to nature conservation	

			(2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]		
[229] Local: Sicily	Law (LR) no. 33 of 9 Dec 1998 (GURS no. 62 of 12 Dec 1998)		It contains urgent measures for the fisheries sector. The aims are to provide subsides in the fisheries sector for (1) disasters not covered by insurances; (2) unemployment; (3) “consorzi”; (4) families of shipwrecked person; and one fishing vessel identified as “orchidea”	It relates to fisheries	
[229b] Local: Sicily	Law (LR) no. 30 of 26 Oct 1998 (GURS no. 55 of 28 Oct 1998, p. 5)		It contains legislative measures for pauses and limitations in the fishery sector. The aims are to provide subsides for temporal stop (more than 30 days) of fishing units 1998 only (una tantum)	It relates to fisheries	
[230] Local: Sicily	Law (LR) no. 26/1998				
[230b] Local: Sicily	Law (LR) no. 33 of 18 May 1996 (GURS no. 26 of 21 May 1996)		It contains urgent legislative measures for the economy, including regulations about fishing. The aims are (1) to enlarge the beneficiaries of some subsidies; and (2) to exclude the duty of demolition of some fishing	It relates to fisheries	

			vessels [See 236]		
[231] Local: Sicily	Law (LR) no. 71 of 3 Oct 1995 (GURS no. 51 of 5 Oct 1995)		It contains urgent measures regarding the territory and the environment. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[232] Local: Sicily	Law (LR) no. 71 of 3 Oct 1995 (GURS no. 51 of 5 Oct 1995) updated by and coordinated with LR 10 of 27 Apr 1999		It contains urgent dispositions about territory and environment. The aims are (1) to conserve natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[234] Local: Sicily	Law (LR) no. 15 of 11 May 1993 (GURS no. 24 of 13 May 1993)		It contains provisions for the production compartments, as well as other dispositions of financial nature and regulations for the reduction rationalization and acceleration of the expenditure. The aim is to provide funds for enforcement and monitoring of the fisheries sector	It relates to fisheries	
[235] Local: Sicily	Law (LR) no. 25 of 7 August 1990 (GURS no. 38 of	Regional office for the cooperation,	It establishes a bonus for the construction of	It relates to fisheries	

	11 Aug 1990)	commerce, handicraft and fishing	non-trawler fishing vessels (art. 1) as well as large trawlers (art. 3); a bonus for demolition of fishing vessels (art. 4); indemnities (art. 5); bonus for local governance structures (consorzi) (art. 7); construction of artificial structures aimed at fish production (art. 8); enforcement (art. 10); communication (art. 11); stakeholder engagement (art. 15). The stated aims are (1) to provide a rational management of the biological resources; (2) to decrease of fishing effort; (3) to increase of biological production and its economical value; (4) to promote the diversification and enhancement of the fish market; (5) to enhance fishermen conditions; and (6) to increase of job opportunities in fisheries and aquaculture. In practice, it encourages the passage from small trawling vessels to large trawling vessels as well as other types of fishing and aquaculture		

			activities		
[236] Local: Sicily	Law (LR) no. 26 of 27 May 1987 (GURS no. 22 of 30 May 1987)	Assesorato regionale per la cooperazione, il commercio , l'artigianato e la pesca	It provides credit facilities and bonus for the construction of non-trawling vessels (art. 2); bonus for the construction and enhancement of non-trawler fishing vessels as well as large trawlers, also reconstruction of previously demolished or wrecked vessels (art. 3); bonus for the demolition of vessels (art. 4); credit facilities and bonus for fishermen cooperatives (art.5, 24, 25); aquaculture and fisheries research (art. 6); decrease of fishing effort and enforcement (art. 8); bonus for the transformation of fishing products; bonus for tuna aquaculture and fishing through fixed nets (tonnare) (art. 12); formation of aquaculture technicians (art. 13); temporal cessation of fishing (art. 14, 15); communication (art. 20); bonus for local governance structures (consorzi) (art. 21);credit facilities and bonus for	It relates to fisheries	

			aquaculture facilities (art. 22, 23); construction of fish markets and port facilities (art. 27, 28) . In practice, it encourages renovation of vessels and the passage from small trawling vessels to large trawling vessels as well as other types of fishing and aquaculture activities		
[239] Local: Sicily	Law (LR) no. 98 of 6 May 1981 (GURS no. 23 of 9 May 1981 ordinary suppl.) updated by and coordinated with Decree of 30 Dec 1999)		It contains regulations for the establishment of natural reserves. The aims are (1) the conservation of natural and cultural heritage; (2) habitat protection; (3) species protection; (4) environmental education and research. See [138; 146]	It relates to nature conservation	
[240] Local: Sicily	Law (LR) no. 1 of 4 Jan 1980 (GURS no. 2 of 12 Jan 1980)		It contains provisions for the rationalization of fishing in Sicily, updated by subsequent laws. It represents a general legal framework for the fisheries sector	It relates to fisheries	
[241] Local: Sicily	Law (LR) no. 70 of 27 Dec 1978 (GURS no. 57 of 30 Dec 1978)		It provides modifications and supplements to the LR no. 31 of 1 Aug 1978 about undertakings for restoring the balance of the fish stocks through	It relates to fisheries	

			restocking works		
[242] Local: Sicily	Law (LR) no. 31 of 1 August 1974 (GURS no. 38 of 10 Aug 1974)		It contains provisions for restoring the balance of the fish stocks through restocking works	It relates to fisheries	
European	EC 813/2004 Regulation and EC 1976/2006	MEPA, TM, AFRD, EU?	Maltese Fisheries Management Zone	25NM management zone	yes
European	Bathing Water Directive and UN Barcelona Convention on the quality of water under LN 380/2003	TM, MTA			Swimming zones yes
National: Malta	Fish Farming Policy Guidelines	MEPA, MAR		Provide advice on applications for the development of aquaculture units	For the fish farms
National: Malta	Development Planning Act	MEPA	Chapter 356 – any development in aquaculture must have a development permit		No
National: Malta	Flora, Fauna and Natural Habitats Protection Regulation	MEPA		Habitats and Birds Directive	For some topics
National: Malta	Antiquities Protection Act	MEPA, Superintendence of Cultural Heritage			no
National: Malta	Maltese Legal Act: Fisheries Conservation and Management Act	AFRD, AFM	Legal Notice no 407 of 2004:	operations and registration of the fishing fleet	no
National: Malta		AFRD, AFM	Government Notice 206 of 1934:	fishing restricted to certain areas	some
National: Malta	Government Notice 173 of 1990 (Filfla)	MEPA, AFM			
National: Malta	Environment Protection Act				no
National:		AFRD, AFM	Trawling zones	Trawlers are	yes

Malta				only allowed to trawl in specified zones within the 25 NM zone	
National: Malta	Notice to Mariners no 67 of 2004	AFM	Conservation Area off il-Merkanti shoals	Only surface fishing is allowed	Yes
National: Malta	Notice to Mariners no 5 of 2008	VAFD	Conservation area around wrecks	No stopping areas	Yes
National: Malta	Notice to Mariners no 6 of 2008	AFM	Protection of Yelkouan Shearwaters	No stopping areas	yes
National: Malta	Malta travel and tourism services act	MTA, MEPA	Legal Notice 357 of 2010	regarding the licence for diving services	no
National: Malta	Legal notice 410 of 2007: licence to retain submarine cables and pipelines				no

Action 1b.2 Identifying sectoral interests

Identify the relevant sectoral interests and stakeholders in the SMA. Some of the main sectors and the interests amongst their representatives in the area, will be explored through the governance analysis in WP6. It may be helpful to refer to action 1a.2 of this framework and section 1.1 of the Governance Analytical Structure to complete this action.

Stakeholder participation at this stage may also help to identify the main sectoral interests in the SMA, as there may not be a comprehensive list of stakeholders identified through the governance analysis.

IDENTIFIED STAKEHOLDERS AND RELATED INTERESTS

Fishermen: Sustainability of the fishery industry
Public administrations and politicians: Compliance with EU directives (e.g. environmental status)
Consortium for Local Management Plan of Fisheries (Co.Ge.Pa): Reduction of conflicts
Research bodies: Conservation of highly valuable areas and environmental status
Enforcement authorities: Mainly involved in controlling illegal immigration
Trade associations: Sustainability of the fishery industry
Tourism industry: Expansion of the tourist industry
Conservationist NGOs: Protection of species and highly valuable areas
Oil companies: Exploration and exploitation of off-shore hydrocarbon deposits
Aeolian energy companies: Deployment of off-shore facilities

Action 1b.3 Identifying and defining objectives of existing management plans

Using the list of management plans under action 1a.1, complete the table below with information regarding their objectives. Categorise objectives into environmental, socio-economic or mixed/other objectives. You may wish to draw on information from the governance analysis to complete this action;

the balance between ecological and socio-economic objectives will be evaluated through the WP6 governance analysis, which draws on institutional settings and the views and perspectives of stakeholders with an interest in the SMA.

Where there are no proposed management plans or management plans in place, move straight to action 1b.4.

*Use relevant policy plans from table 1a.1.

Table 1b.3. Objectives of some existing management plans in the Strait of Sicily

Plan name	Plan objectives	Are the objectives ecological (E) socio-economic (SE) mixed or other (O)?	Area for which the objective is relevant (whole region / part of the region)	Objective deadline	Conflicts with other management plans or objectives
National Operational Plan for the fishery sector	Enhancement of the conservation status of the environment and its resources through the reduction of the fisl	E	Italian territorial waters (part of the study area)	2013	
	Reduction of the socio-economic impact of the reduction of fishing effort	SE		2013	
	Increase of the economic competitiveness	SE		2013	
National Strategic Plan	Reduction of fishing effort in terms of activity and capacity to allow for rebuilding of fish stocks	E	Italian territorial waters within the study area (part of the study area)	2013	
	Recovery of competitiveness of fisheries, aquaculture and transformation of fish products, as well as enhance	SE		2013	
	Overcome of the sector social and economical exclusion, re-organization of the sector, modernization of struc	SE		2013	
	Sustain fishery-based areas towards their sustainable development	SE		2013	
	Defence of long-termed job positions, maintenance of the workers' welfare also through supplementary work	SE		2013	
	Ecosystem restoration through protection of the fauna and flora, development of research activities and profe	E		2013	
	Reinforcement of controls on production structures, fishing and commercialization activities	SE		2013	
	Strengthening and enhancement of national and regional management	O		2013	
Management Plan GSA 10 Middle-South Tyrrenian Sea. Trawl	Preservation of the stocks capacity of recovering from fishing	E	Italian territorial waters within the FAO GSA 10 (part of the study area)	2013	
	Enhancement of the workers' welfare	SE		2013	
	Increase of job opportunities in fishery-depending areas	SE		2013	
Management Plan GSA 16 (Sicily Strait). Trawl > 18m	Preservation of the stocks capacity of recovering from fishing	E		2013	
	Enhancement of the workers' welfare	SE		2013	
	Increase of job opportunities in fishery-depending areas	SE		2013	
Sicilian management Plan. Trawl LOB < 18m	Preservation of the stocks capacity of recovering from fishing	E	Italian territorial waters within the study area (part of the study area)	2013	
	Enhancement of the workers' welfare	SE		2013	
	Increase of job opportunities in fishery-depending areas	SE		2013	
National Management Plan for boat seines	Exploitation of biological resources within sustainable limits	E		2013	
	Fisheries economic sustainability	SE		2013	
	Maintenance of job positions and adequate entry levels	SE		2013	
Management Plan of the Sicilian fleet - purse seines for small pelagic fishes	Preservation of the stocks capacity of recovering from fishing	E		2013	
	Enhancement of the workers' welfare	SE		2013	
	Increase of job opportunities in fishery-depending areas	SE		2013	
Sicilian Energetic and Environmental Plan	Adoption of efficient energetic systems for use in production, services and residences	O		2012	
	Promotion of energy saving politics, particularly in buildings	O		2012	
	Promotion of diversification, decentration and decarbonization of electricity sources	O		2012	
	Promotion of renewable energies and related technologies	O		2012	
	Facilitation of the creation and growth of energy industries	SE		2012	
	Liberalization of the energy market and enhanced security in energy supplies	SE		2012	
	Introduction of the best available clean technologies for highly demanding industries	O		2012	
	Promotion of hydrocarbon exploitation in line with law no. 239/2004	SE		2012	(1)
	Riformation of conventional power plants to meet the Kyoto protocol and EU regulations	E		2012	
	Promotion of large electrical networks	SE		2012	
	Promotion of the completation of methane networks	SE		2012	
	Promotion of the development of hydrogen technologies	SE		after 2012	
	Optimization of transport (biofuels, methane, trafic reduction, train and ship transport of goods)	O		2012	
Local Management Plan of the maritime compartment of Mazara del Vallo	Preservation of the stock turn-over capacity: Enhancement of the CPUEs	O	Waters off the shoreline of Mazara del Vallo, Campobello di Mazara	2013	
	Preservation of the stock turn-over capacity: Increase of the commercial length	O	and Castelvetrano municipalities (part of the study area)	2013	
	Reduction of fishing effort: Reduction of the fishing days per year	E		2013	
	Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE		2013	
	Increase in job opportunities: Job positions in fishing related activities	SE		2013	
Local Management Plan of the maritime compartment of Trapani	Preservation of the stock turn-over capacity: Enhancement of the CPUEs	O	Waters off the shoreline of Castellammare del Golfo, San Vito lo Capo	2013	
	Preservation of the stock turn-over capacity: Increase of the commercial length	O	Custonaci, Valderice, Erice, Favignana, Trapani, Paceco, Marsala	2013	
	Reduction of fishing effort: Reduction of the fishing days per year	E	and Petrosino municipalities (part of the study area)	2013	
	Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE		2013	
	Increase in job opportunities: Job positions in fishing related activities	SE		2013	
Local Management Plan of the Pelagie Islands	Preservation of the stock turn-over capacity: Optimization of the CPUEs	O	Waters off the shoreline of Lampedusa, Linosa	2013	
	Preservation of the stock turn-over capacity: Increase of the commercial length	O	and Lampione municipalities (part of the study area)	2013	
	Reduction of fishing effort: Reduction of the fishing days per year	E		2013	
	Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE		2013	
	Increase in job opportunities: Job positions in fishing related activities	SE		2013	
Local Management Plan of the Pantelleria Island	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of the fishing effor	E	Waters off the shoreline of Pantelleria municipality (part of the Study area)	2013	
	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Optimization of the CPUEs	O		2013	
	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of bycatch	E		2013	
	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of environmental i	E		2013	
	Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE		2013	
	Enhancement of the economy of the fishery workers: Promotion of undervaluated products	SE		2013	
	Enhancement of the economy of the fishery workers: Reduction of the cost of fishing and associated activities	SE		2013	
	Increase in job opportunities: Job positions in fishing related activities	SE		2013	

Malta's Fisheries Management Plan	Sustain Malta's Marine Fisheries Resources and the habitats and ecosystems upon which they depend	E	Maltese territorial waters	2020
	Maintain a viable fishing industry as part of Malta's economic strategy	SE		2020
	Improve public understanding of and involvement in fisheries management	SE		2020
Malta's National Strategic Plan for Fisheries 2007-2013	Adjustment of fishing effort to sustainability	O	Maltese territorial waters	2013
	Development of processing and marketing sectors	SE		2013
	Enhancement of the infrastructure servicing fisheries and aquaculture	SE		2013
	Improvement of the quality of life in coastal areas by the diversification of employment propects	SE		2013
	Improvement of competitiveness of the fishery sector	SE		2013
Fisheries Operational Programme for Malta	Adjustment of fishing effort to sustainability	O	Maltese territorial waters	2013
	Modernization of the fishing fleet	SE		2013
	Increased trained fishers	SE		2013
	To reduce negative impact on the environment	SE		2013
	To enhance the processing and packaging facilities of the aquaculture and fisheries industries	SE		2013
	To enhance the promotion and marketing of species and products of interest to the market	SE		2013
	Upgrading of fisheries infrastructure at designated ports	SE		2013
	Relocation of fish markets	SE		2013
	Facilitating marketing and promotional campaigns	SE		2013

(1) This objective is in conflict with other ones in the same policy, in particular the objective of “decarbonization” and the objective of meeting Kyoto protocol and EU directives.

Action 1b.4 Assessment of operational objectives

Operational objectives should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound):

- **Specific –** Objectives should be clearly defined.
- **Measurable –** It should be possible to quantify the objectives.
- **Achievable –** Targets should be achievable in practice.
- **Realistic –** Defined targets should be achievable in the given time frame.
- **Time-bound -** A timeline should establish the deadlines for the fulfillment of defined targets.

Filling out table 1b.4.1 will show which objectives are not SMART. Where an operational objective is considered not to be SMART this information should be retained as you may wish to include these as a part of your assessment at a later date or as part of a subsequent iteration. They should also be recorded and presented in the reporting phase during step 7.

Table 1b.4. Assessing operational objectives against SMART criteria

ID no.	Operational objective	Specific	Measurable	Achievable	Realistic	Time-bound	Data quality
1	Enhancement of the **conservation status** of the environment and its resources through the reduction of the f	Y	Y	Y	N	Y	Poor
2	Reduction of the **socio-economic impact** of the reduction of fishing effort	Y	Y	Y	N	Y	Medium
3	Increase of the economic **competitiveness**	Y	Y	Y	N	Y	Good
4	Reduction of fishing effort in terms of activity and capacity to allow for **rebuilding of fish stocks**	Y	Y	Y	Y	Y	Good
5	Recovery of **competitiveness** of fisheries, aquaculture and transformation of fish products, as well as enhanc	N	N	Y	N	Y	Medium
6	Overcome of the sector **social and economical exclusion**, re-organization of the sector, modernization of st	N	Y	Y	N	Y	Medium
7	**Sustain** fishery-based areas towards sustainable development	N	Y	Y	N	Y	Poor
8	Defence of **long-termed job positions**, maintenance of the workers' welfare also through supplementary wo	N	Y	Y	Y	Y	Medium
9	**Ecosystem restoration** through protection of the fauna and flora, development of research activities and pro	N	Y	Y	N	Y	Poor
10	**Reinforcement of controls** on production structures, fishing and commercialization activities	Y	Y	Y	Y	Y	Poor
11	Strengthening and enhancement of national and regional **management**	Y	Y	Y	Y	Y	Poor
12	Preservation of the **stocks capacity** of recovering from fishing	Y	Y	Y	N	Y	Medium
13	Enhancement of the **workers' welfare**	Y	Y	Y	N	Y	Good
14	Increase of **job opportunities** in fishery-depending areas	Y	Y	N	N	Y	Good
15	Exploitation of resources within **biological sustainability**	Y	Y	Y	N	Y	Medium
16	Achievement of fisheries **economic sustainability**	Y	Y	Y	Y	Y	Poor
17	Maintenance of job positions and adequate **entry levels**	Y	Y	N	N	Y	Good
18	Adoption of systems **energetically efficient** for use in production, services and residences	Y	Y	Y	N	Y	Poor
19	Promotion of **energy saving** politics	Y	Y	Y	Y	Y	Poor
20	Promotion of diversification, decentration and **decarbonization** of electricity sources	Y	Y	Y	N	Y	Poor
21	Promotion of **renewable energies** and related technologies	Y	Y	Y	Y	Y	Poor
22	Facilitation of the creation and growth of **energy industries**	Y	Y	Y	Y	Y	Poor
23	**Liberalization** of the energy market and enhanced **security** in energy supplies	N	Y	Y	Y	Y	Poor
24	Introduction of the best available **clean technologies** for highly demanding industries	Y	Y	Y	N	Y	Poor
25	Promotion of **hydrocarbon exploitation** in line with law no. 239/2004	Y	Y	Y	Y	Y	Good
26	Riformation of conventional power plants to meet the **Kyoto protocol** and **EU directives**	Y	Y	Y	N	Y	Good
27	Promotion of large **electrical networks**	Y	Y	Y	Y	Y	Good
28	Promotion of the completation of **methane networks**	Y	Y	Y	Y	Y	Good
29	Promotion of the development of **hydrogen technologies**	Y	Y	Y	N	N	Poor
30	Optimization of **transport** (biofuels, methane, trafic reduction, train and ship transport of goods)	N	Y	Y	N	Y	Medium
31	Preservation of the stock turn-over capacity: Increase of the **CPUEs**	Y	Y	Y	N	Y	Good
32	Preservation of the stock turn-over capacity: Increase of the **commercial length**	Y	Y	Y	N	Y	Good
33	Reduction of fishing effort: Reduction of the **fishing days** per year	Y	Y	Y	Y	Y	Good
34	Increase in job opportunities: **Job positions** in fishing related activities	Y	Y	Y	N	Y	Good
35	Preservation of the stock turn-over capacity: Optimization of the **CPUEs**	Y	Y	Y	Y	Y	Good
36	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of the **fishing effc**	Y	Y	Y	N	Y	Good
37	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Optimization of the **CPUEs**	Y	Y	Y	Y	Y	Good
38	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of **bycatch**	Y	Y	Y	Y	Y	Good
39	Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of **environmental**	Y	Y	Y	Y	Y	Poor
40	Enhancement of the economy of the fishery workers: Enhancement of the **revenue** over the inflaction of fishir	Y	Y	Y	N	Y	Good
41	Enhancement of the economy of the fishery workers: Promotion of **undervaluated products**	Y	Y	Y	Y	Y	Good
42	Enhancement of the economy of the fishery workers: Reduction of the **cost** of fishing and associated activitie	Y	Y	N	N	Y	Medium
43	Sustain Malta's marine fisheries **resources** and the **habitats** and **ecosystems** upon which they depend	N	N	Y	Y	Y	Poor
44	Maintain a **viable** fishing industry as part of Malta's economic strategy	Y	Y	Y	Y	Y	Medium
45	Improve **public** understanding of and involvement in fisheries management	Y	Y	Y	N	Y	Poor
46	Adjustment of **fishing effort** to sustainability	Y	Y	Y	N	Y	Poor
47	Development of **processing and marketing** sectors	Y	Y	Y	Y	Y	Good
48	Enhancement of the **infrastructure** servicing fisheries and aquaculture	Y	Y	Y	Y	Y	Good
49	Improvement of the **quality of life** in coastal areas by the diversification of employment propects	Y	Y	Y	Y	Y	Medium
50	Improvement of **competitiveness** of the fishery sector	Y	Y	Y	Y	Y	Good
51	**Modernization** of the fishing fleet	Y	Y	Y	Y	Y	Good
52	Increased **trained** fishers	Y	Y	Y	Y	Y	Good
53	To reduce negative **impact on the environment**	Y	Y	Y	Y	Y	Medium
54	To enhance the **processing and packaging** facilities of the aquaculture and fisheries industries	Y	Y	Y	Y	Y	Good
55	To enhance the **promotion and marketing** of species and products of interest to the market	Y	Y	Y	Y	Y	Good
56	Upgrading of fisheries **infrastructure** at designated ports	Y	Y	Y	Y	Y	Good
57	Relocation of **fish markets**	Y	Y	Y	Y	Y	Good
58	Facilitating **marketing and promotional** campaigns	Y	Y	Y	Y	Y	Good

Action 1b.5 Assessment of policy approaches

Policy approaches can be top-down (imposed by government), bottom-up (meeting popular demands from end users), or a combination of the two. The balance between these policy approaches will give an indication of how likely end-users will be to follow enforcement laws in the SMA. The discussions through section 4 of the Governance Analytical Structure are particularly relevant to this; use this information to provide a short written assessment of the policy approaches.

Section 4 of the GA is not available for the Strait of Sicily yet. However, it is safe to state that the political approach is largely top-down in the Italian territory, less so in Mata, and largely sectoral and fragmented over the whole study area.

Action 1b.6 Concluding on operational objectives

Using table 1b.4, fill in table 1b.6.1 below to give an overall view of the goals and operational objectives. When filling in the table, if possible, put linked legal obligations, policy goals, operational objectives or management goals on one line. Where a legal obligation, policy goal or operational objective is additional to a management plan or where a management plan does not exist this column will remain empty.

The defined area, time scale and review period may not be equal for different legal obligations, policy and management goals and operational objectives. In this case, use the specifics of the management plan, as this is a SMART tool for management of the Marine Area.

Table 1b.6.1. Goals and operational objectives.

Legal obligations	Policy goals or operational objectives (synthesis)	Management plan goals or operational objectives (from table 1b.4)	Derived operational objectives (synthesis)	Define the area for the objectives(entire case study area, or just a specific part)	When should the goal be achieved?	How often will the goal be reviewed?
1_1, 1_2, 2_1, 10_1, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 92_2, 106_2, 108_2, 110, 111c_4, 116, 116b, 118, 145_1, 181_4, 189b, 195_1, 200, 200b, 201, 212_1, 235_2, 236_2] plus National Operative Program for the fishery sector in Italy, National Strategic Program, Management Plan for Trawl in GSA 10, Management Plan for Trawl > 18m lob in GSA 16, Management Plan for fishing vessels lob < 18 m in Sicily, National Management Plan for boat	Reduction of fishing mortality to reference values (specific for each sector and indicator) through the reduction of fishing effort by (roughly) 20% - CFP	4, 10, 33, 36, 37, 38	[D1] Substantial reduction (about 20%) and rationale spatial allocation of fishing effort by 2013	Territorial waters, but some provisions affect EU vessels and citizens in the high sea	2013	Between 6 months and 5 years, on depending of the availability of data for specific indicators. Undefined in many instances ("whenever suggested by annual reports")

seines						
[2_7, 3_1, 4_1, 5_1, 7_1, 8_1, 6_1, 6_2, 10_1, 66_2, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 89_1, 89_2, 89_3, 91_4, 92_1, 93, 96_2, 96_3, 96_4, 96_7, 97_1, 102_1, 102_3, 102_5, 102_6, 103b, 104_1, 105, 106_1, 106_2, 108_1, 108_2, 109_2, 109b_2, 111c_2, 111c_4, 111c_5, 111c_6, 111c_7, 111c_8, 115a, 116, 116b, 117, 118, 120, 122_1, 122_2, 122_4, 123, 124, 126, 127, 133, 134b, 134c, 134f, 135, 136, 137, 137f, 137e, 138b_3, 138c_4, 139, 145_1, 145_4, 148, 149_2, 157, 166_2, 168, 179_1, 179_2, 179_3, 180, 181_2, 182_4, 183_2, 185c, 185d, 185e, 188b, 191b, 193b, 195_2, 195_3, 195_4, 195_5, 198, 200, 200b, 201, 207, 209, 212_1, 212_2, 215, 216, 218, 229_3, 234, 235_1, 236_1] plus National Operative Program for the fishery sector in Italy, National Strategic Program, Management Plan for Trawl in GSA 10, Management Plan for Trawl > 18m lob in GSA 16, Management Plan for fishing vessels lob < 18	Sustainable fisheries - CFP	7, 12, 15, 16, 31, 32, 35, 43, 44, 46	[D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Waters within 12 nm of the Italian coastline, but some provisions affect EU vessels and citizens in the high sea	2013	Between 6 months and 5 years, on depending of the availability of data for specific indicators. Undefined in many instances (“whenever suggested by annual reports”)

m in Sicily, National Management Plan for boat seines						
[1_2, 1_3, 2_2, 2_3, 2_4, 2_5, 2_8, 3_2, 4_2; 5_2, 7_2, 8_2, 10_2, 3_3, 4_3, 5_3, 7_3, 8_3, 10_3, 6_3, 63_1, 97_4, 97_5, 134, 97_6, 104_4, 104_5, 104_6, 106_2, 108_2, 111, 111c_7, 112, 112b, 113, 118, 122b_1, 127, 133, 138b_2, 138c_4, 140b_1, 145_2, 145_3, 147c_1, 147c_2, 181_3, 181_5, 182_1, 183_2, 183_3, 183_5, 188c, 189, 200, 200b, 201, 212_5, 212_7, 224, 229_1, 229_2, 229b, 230b_1, 235_5, 235_6, 236_5, 236_6] plus National Operative Program for the fishery sector in Italy, National Strategic Program, Management Plan for Trawl in GSA 10, Management Plan for Trawl > 18m lob in GSA 16, Management Plan for fishing vessels lob < 18 m in Sicily, National Management Plan for boat seines	Economically viable fishing industry providing employment and opportunities for coastal communities - CFP	2, 3, 5, 6, 8, 13, 14, 17, 34, 40, 41, 42, 49	[D2] financial viability and safe working conditions for fishermen by 2013	Waters within 12 nm of the Italian coastline, but some provisions affect EU vessels and citizens in the high sea	2013	Between 6 months and 5 years, on depending of the availability of data for specific indicators. Loosely defined in many instances ("whenever suggested by annual reports")
[2_6, 15, 16, 17, 18, 60, 61, 63_1, 63_2, 66_1, 67, 68_1, 68_2, 69, 70, 84, 85, 86_1, 86_2, 86_3, 86b_1, 86b_2, 87, 89_1, 90_1, 90_2, 90_3, 90_4, 91_1, 91_2, 91_3, 91_4, 94, 95,	Healthy marine environment - MSFD	1, 9, 26, 39, 53	[D3] Nature conservation, environmental protection, and substantial reduction (about 20 %) of loss of specific biodiversity components (species	Waters within 12 nm of the Italian coastline, but some provisions affect EU vessels and citizens in the high sea	2013	Between 6 months and 5 years, on depending of the availability of data for specific indicators. Loosely defined in many instances ("whenever

96, 96_1, 96_3, 96_4, 96_5, 96_6, 96_7, 97_1, 97_2, 97_3, 97_4, 97_5, 98, 99, 100, 101_1, 101_2, 101_3, 101_4, 102_1, 102_2, 102_4, 102_5, 102_6, 103a, 103b, 104_1, 104_2, 104_3, 104_4, 105_5, 107, 109_1, 109_2, 109b_1, 109b_2, 111b, 111c_1, 111c_2, 111c_3, 111c_5, 111c_8, 114, 115b, 115d, 117, 119, 121, 122_3, 122b_2, 123, 125_1, 125_2, 125b_1, 125b_2, 125b_3, 125b_4, 125c, 129_1, 129_2, 129_3, 129_4, 129_5, 130, 131, 132b_1, 132b_2, 132b_2.1, 132b_2.2, 132b_2.3, 132b_2.4, 134, 134c, 134d, 134e, 134f, 137c_1, 137d, 137e, 138_1, 138_2, 138_3, 138b_1, 138b_4, 138c_1, 138c_2, 138c_3, 138c_5, 140_1, 140_2, 140b_2, 141_1, 141_2, 141_3, 141_4, 141b, 142, 142b, 142c, 143, 143_1, 143_2, 143_3, 143_4, 143_5, 143b, 144, 144b, 146_1, 146_3, 146_4, 147, 147b, 147c_1, 147c_2, 149, 149_1, 149_2, 150_1, 150_2, 150_3, 150_4, 151, 152, 153, 154, 155, 156, 158, 159, 160, 161, 162, 163, 164, 166_1,			richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020			suggested by annual reports")

167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 182_1, 182_2, 183_1, 183_2, 183_3, 183_4, 184, 185, 186_1, 186_2, 186_3, 187, 188, 190, 191, 193, 194, 196, 197, 198, 199, 202, 203, 204, 205, 206, 208, 210, 213, 214, 217, 219, 220, 221, 222, 223, 225, 226, 227, 228, 231, 232, 239] plus National Operative Program for the fishery sector in Italy, National Strategic Program, Management Plan for Trawl in GSA 10, Management Plan for Trawl > 18m lob in GSA 16, Management Plan for fishing vessels lob < 18 m in Sicily, National Management Plan for boat seines						
[101_4, 150_1, 183_1, 188c]	Conservation of natural and cultural heritage (sites of particular importance because of their scientific, aesthetic, cultural or educational interest) – UNEP RAC SPA, Biodiversity 2020		[D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date	Human settlements in the islands within the study area	NA	NA
Council Regulation (EC) 1967/2006			A1 – assessment of the stocks for the most important commercial species	25 Nautical Mile Fisheries Zone (FMZ)	Ongoing	Annually
			A2 – identification of 'essential fish habitats' for the most important		Ongoing	Annually

			stocks			
			A3-identification of current trawling grounds both spatially and temporally			
			A4- using fishing effort as an indicator of trawling pressure		2014	Annually
			A5-identifying the impacts of trawling on the fishing grounds, including the commercial species, non-commercial species and habitats and its relationship to trawling pressure		2015	Annually
			A6-possibility of the relocation of fishing effort and the current authorized trawling grounds		2015	Annually
			A7- the supply of continuous information of the state of demersal resources		ongoing	Annually
			A8-identification and characterization of the biogenesis in territorial waters		2014	Annually
			A9-identification and characterization of habitats listed in the habitats directive especially in trawling grounds		2014	Annually
			A10-characterization of the discards from the trawl		2012	Annually

			fishery in terms of species composition, biomass and density indices			
			A11- identification of incidental captures of any protected species especially in trawling grounds		2012	Annually
			A12- identification of critical habitats for species of bird fauna			
			A13 – possibility of introducing mitigating measures for the protection of habitats protected species and reduction of discards		2015	Annually
			A14- development of a monitoring program to monitor the evaluation of the protection measures		2015	Annually
			A15- assess current socio-economic situation of fishery		Ongoing	Annually
			A16- assess likely socio-economic impacts of management measures proposed to manage fishery		2013	Annually
			B1- characterization of the associated species caught together with the dolphinfish in terms of species composition		Ongoing	Annually

			abundance and biomass and collection of biological stock related parameters			
			B2- assessment of the dolphinfish stocks		2012 (subject to successful collaboration with scientists from neighbouring countries exploiting the same stock)	Annually
			B3- monitoring of the dolphinfish stocks		2012 (subject to successful collaboration with scientists from neighbouring countries exploiting the same stock)	Annually
			B4- identification of the impact of the fish aggregating devices (FADs) and seine nets on non-commercial species caught in the fishery		2013	Annually
			B5- identification of the impact of the limestone slabs and nylon ropes used for the FADs on the benthic environment		2015	Annually
			B6- Research activities to identify alternative materials to construct FADs		2014	Annually

			B7- possibility of introducing mitigation measures for the protection of any negative impacts resulting from B4 AND B5		2015	Annually
			B8– assess current socio-economic situation of fishery		Ongoing	Annually
			B9- assess likely socio-economic impacts of management measures proposed to manage fishery		2015	Annually
			C1- characterization of the associated species caught together with the target purse seine catch in terms of species composition abundance and biomass and collection of biological stock related parameters		Ongoing	Annually
			C2- assessment of the small pelagic stocks`		2014	Annually
			C3 – monitoring of the small pelagic stocks		2014	Annually
			C4 – identification of the impact of the purse seine nets on non-commercial species caught in the fishery		Ongoing	Annually
			C5- possibility of		2014	Annually

			introducing mitigating measures for the protection of any negative impacts resulting from C4.			
			C6- assess current socio-economic situation of fishery		Ongoing	Annually
			C7- assess likely socio-economic impacts of management measures proposed to manage fishery		2017	Annually
			D1- characterization of the associated species caught together with target seine catch in terms of species composition abundance and biomass and collection of biological stock related parameters		ongoing	Annually
			D2- assessment of target stock *Aphia minuta*		2014	Annually
			D3- monitoring of the target stock		2014	Annually
			D4- identification of the impact of the seine nets on non-commercial species caught in the fishery		ongoing	Annually
			D5- possibility of introducing mitigating measures for the protection of any negative impacts resulting from D4		2014	Annually

			D6- assess current socio-economic situation of fishery		ongoing	Annually
			D7- assess likely socio-economic impacts of management measures proposed to manage fishery		2017	Annually

Separate the operational objectives in table 1b.6.1 into three categories: ecological, socio-economic and other/mixed. List these in table 1b.6.2.

Next a prioritisation exercise should be undertaken to consider the relative importance of ecological, socio-economic and other operational objectives, depending on the higher level goals of the SMA. (This exercise could be done with the help of stakeholders.) Prioritisation of the most important objectives provides a focus for further assessment and facilitates easier progression though the remaining steps of the framework.

Populate table 1b.6.2 with information about the objectives. Indicate in table 1b.6.2 which objectives will be carried forward for further assessment and state the reason for your conclusions.

Consideration could be given to:

- High-level political goals – what political processes and policies are there in place?
- Other Drivers
  - Environmental, social, political and economic drivers
  - Standards set – for example MSFD targets
  - Stakeholders – who is involved and why?
  - Conflicts between objectives and between stakeholders
- Geography
  - Spatial extent – which objectives have the widest spatial influence?
  - Inshore versus offshore
  - Sub-regional, regional and national differences
  - Trans-boundary issues
- Objective characteristics
  - Status of the objective and trend information – for example, has the objective been met or is it at risk of failing?
  - Does the objective overlap with any other objectives?
  - How many components are covered by one objective?
- Data availability/accessibility

Table 1b.6.2. Prioritisation of operational objectives.

Ecological operational objective	Reasons why important	Focus for assessment? Y/N
[D3] Nature conservation, environmental protection, and substantial reduction (about 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020	Essential for sustainability in the area, which is characterized by overexploitation of most natural resources. It is therefore necessary for the feasibility of the rest of objectives	Y
A2 – identification of 'essential fish habitats' for the most important stocks	Of some importance for the sustainability of fish stocks, yet a way for reducing fishing effort and provide protection to some areas	N
A9- identification and characterization of habitats listed in the habitats directive especially in trawling grounds	Baseline information for informed decision-making on the protection of important habitats	N
A11- identification of incidental captures of any protected species especially in trawling grounds	Mortality information needed for successful conservation initiatives	N
A12- identification of critical habitats for species of bird fauna	Baseline information for informed decision-making on the conservation of target species	N
A13 – possibility of introducing mitigating measures for the protection of habitats, protected species and reduction of discards	Reduction of environmental impact as a practical way towards sustainability	N
A14- development of a monitoring program to monitor the evaluation of the protection measures	Baseline information for informed decision-making on the adequacy of protection measures	N
Socio-economic operational objective	Reasons why important	Focus for assessment? Y/N
[D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Necessary for the viability of the fishery sector as in objectives D2 and D5	Y
[D2] Financial viability and safe working conditions for fishermen by 2013	Necessary for the objective D5	Y
A1 – assessment of the stocks for the most important commercial species	Necessary information for a sustainable exploitation of the stocks	N
A3 - identification of current trawling grounds both spatially and temporally	Necessary information for a sustainable management of the fishing effort	N
A4 - using fishing effort as an indicator of trawling pressure	Represents a practical way to by-pass the paucity of data, which are fundamental for sound management	N

A5 - identifying the impacts of trawling on the fishing grounds, including the commercial species, non-commercial species and habitats and its relationship to trawling pressure	Represents the will for gathering the necessary information for sound and sustainable management	N
A6 - possibility of the relocation of fishing effort and the current authorized trawling grounds	Allows the adaptation of current management to the upcoming available information to achieve sustainability	N
A7 - the supply of continuous information of the state of demersal resources	Represents the will for gathering the necessary information for sound and sustainable management	N
A8 - identification and characterization of the biogenesis in territorial waters	Represents the will for gathering the necessary information for sound and sustainable management	N
A10 - characterization of the discards from the trawl fishery in terms of species composition, biomass and density indices	Represents the will for gathering the necessary information for sound and sustainable management	N
A15 - assess current socio-economic situation of fishery	Represents the will for gathering the necessary information for sound and sustainable management	N
A16 - assess likely socio-economic impacts of management measures proposed to manage fishery	Represents the will for gathering the necessary information for sound and sustainable management	N
Other/Mixed operational objective	Reasons why important	Focus for assessment? Y/N
[D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date	One of the few ways to achieve objectives D3 and D4 in practice, but not present as operational objective	N

Action 1b.7 Record Keeping

Since completion of the actions in step 1b may require a range of specialist expertise, it is possible that a number of different specialists may be involved in completion of the step (particularly with regard to the prioritisation of operational objectives in 1b.6, for which it is recommended that more than one assessor should participate, to reduce the level of subjectivity in the assessment). A record should, therefore, be kept of who has completed the work. Complete table 1b.7 with the relevant details.

Table 1b.7. Individuals involved in completion of Step 1b.

Section	Date	Name(s) of assessor(s)	Job title and organisation
1b.1	August 2012	Tomas Vega Fernandez	Researcher CNR

Next omit action 1b.8 and progress to step 2.

Action 1b.8 Collate and summarise operational objective information

Complete this action if you are evaluating a single spatial management plan. You have been directed to this action from action 1a.5.

Collate and summarise in table 1b.8, the operational objectives described in the spatial management plan.

Table 1.b.8 Operational objectives of your spatial management plan or initiative.

Plan name	Date of implementation	Review cycle (years)	Objectives	Objective deadline

Once this action is complete, move on to Step 2.

Step 2 Existing information collation and mapping

Step 2a Identify ecosystem components

The aim of step 2a is to identify the ecosystem components in the SMA which are relevant to the objectives that have been set in step 1b. Ecosystem components can be divided into natural (biophysical) components (e.g. marine mammals) and socio-economic components (e.g. a wind farm). A list of natural ecosystem components taken from the MSFD Annex iii has been provided to give guidance on identifying the relevant ones. This is not an exhaustive list and it can be added to and expanded depending on the SMA that is being evaluated. Once ecosystem components are identified for the area, they should be mapped using GIS tools. Mapping should be done using the appropriate scale for each component (e.g. larger scales for marine mammals which are distributed over wide areas) and the GIS maps should aim to cover the entire SMA. The output from step 2a should be a list of relevant ecosystem components along with GIS maps of their coverage (where possible).

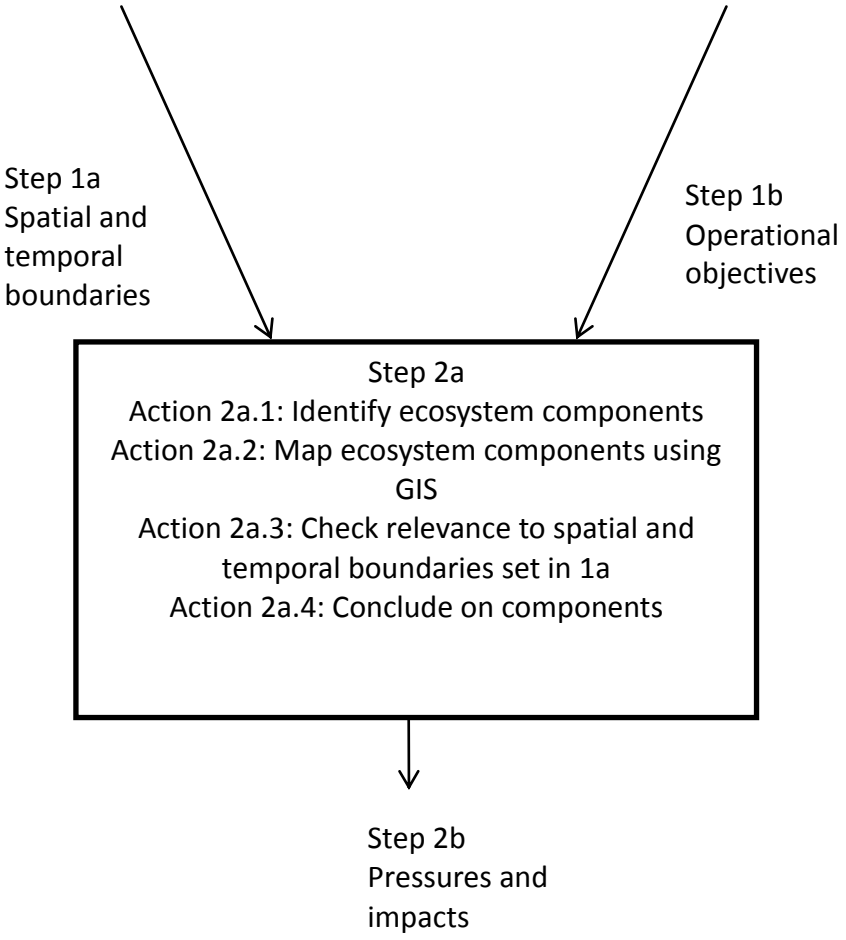


Figure 2a. Work flow for step 2a.

Action 2a.1 Using table 2a.1.1 provided identify the ecosystem components relevant to the SMA and the objectives defined in 1b.

Table 2a.1.1: MSFD list of ecosystem components (Table has been taken from the MSFD annex iii and can be added to depending on the SMA under evaluation).

Type	Ecosystem component
Physical and chemical	Topography and bathymetry of the seabed
	Temperature regime, current velocity, upwelling, wave exposure, mixing characteristics, turbidity and residence time
	Salinity
	Nutrients
	Marine acidification
Habitat types	Predominant habitat types
	Special habitat types
	Identification of habitats in special areas
Biological features	Biological communities including phytoplankton and zooplankton communities
	Angiosperms, macro-algae and invertebrate bottom fauna
	Fish populations
	Marine mammals and reptiles
	Seabirds
	Protected species
	Exotic species
Other features	Chemicals
	Any other features or characteristics typical of or specific to the SMA

Fill out table 2a.1.2 below with the list of ecosystem components in the SMA. Indicate where these have been taken from table 2a.1.1 above or another reference and indicate which operational objective listed in step 1b the component is relevant to.

Table 2a.1.2 for Sicily

Ecosystem component	Reference (e.g. MSFD or other)	Relevant objective
Topography and bathymetry of the seabed	MSFD, British Oceanographic Data Centre (GEBCO), IAMC	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020
Surface circulation pattern	MSFD, IAMC	[D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity

		components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Predominant habitat types (benthic biocenosis)	MSFD, IAMC	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Special habitat types (nurseries)	MSFD, IAMC	[D1] Substantial reduction (20%) and rationale spatial ; [D2] financial viability and safe working conditions for fishermen by 2013allocation of fishing effort by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
(Demersal) fish populations	MSFD, Italian GRUND, Mediterranean MEDITS	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Distribution of fishing effort	GFCM	[D3] Nature conservation, environmental protection, and substantial reduction (20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic

		webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
FAO Geographical SubAreas	FAO	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Territorial and Fisheries Limits	IAMC	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Ports (Commercial, Fishing)	Italian Hydrographic Institute of Italian Navy	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date
Fish biodiversity	IAMC	[D3] Nature conservation, environmental protection, and substantial reduction (20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020;

		[D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Spawning areas of target species	IAMC	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Petroleum and gas facilities	Ministry of Economic Development	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Shipwrecks	Ministry of the Environment - ISPRA	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013
Untrawlable areas	IAMC	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date; [D5] Preservation of specific issues regarding the cultural heritage (say artisanal

		fisheries) within a given date
Marine protected areas (MPAs)	Ministry of the Environment	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date; [D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date
Natura 2000 Sites of Community Importance (SCIs)	Sicilian Regional Government	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020
Natura 2000 Special Protection Areas (SPAs)	Sicilian Regional Government	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020
Specially Protected Areas of Mediterranean Importance (SPAMIs)	UNEP Mediterranean Action Plan	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population

		genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020
Projected offshore wind farms	FourWind Ltd	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Italian continental shelf limits	Ministry of Economic Development	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date
Underwater cables	Hydrographic Institute of Italian Navy	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013
Underwater pipelines	Hydrographic Institute of Italian Navy	[D1] Substantial reduction (20%) and rationale spatial allocation of fishing effort by 2013

Table 2a.1.2 for Malta

Ecosystem component	Reference (e.g. MSFD or other)	Relevant objective
Bathymetry of the seabed	MSFD	
Predominant habitat types	MSFD	
Special habitat types	MSFD	
Biological communities including phytoplankton and zooplankton communities	MSFD	
Fish populations	MSFD	

Protected Species	MSFD	

Action 2a.2: Collect spatial information on ecosystem components / map ecosystem component

When collating spatial maps of ecosystem components the following aspects should be outlined:

- How will the maps be stored? ESRI shapefiles
- What scale of mapping will be used? This will vary depending on the component being mapped e.g. a special habitat type may be mapped in a much finer resolution than the breeding grounds of seabirds. 1: 5000 to 1: 10 000 (for Maltese islands only – still have to decide how to join with Sicilians. The same question from the Sicilian counterpart. Can we allocate funds for CS meetings. If so, which ones?
- Further details regarding co-ordinate systems, map projections and meta-data standards are outlined further under the 'manual user guide'.
    - Universal Transverse Mercator - zone 33N, WGS 1984
    - Metadata - geonetwork
- Restrictions on use or publication of existing spatial data. Will depend on each layer data source

These issues should be discussed and decided upon before taking any further action in close cooperation with WP5. Where possible, maps should cover the entire SMA.

Good information

Where there is good information available on the ecosystem components listed in table 2a.1.2 above collate relevant GIS layer files in as much detail as possible about the spatial coverage of that ecosystem component.

Intermediate information

Where information on ecosystem components is not readily available then use expert judgement to compile GIS layer files on the spatial coverage of the ecosystem component. This may just be a rough polygon layer showing the possible area the component is likely to cover.

Poor/ no information

Where there is poor or no data available then any available literature on the ecosystem components should be compiled that may enable a judgement to be made.

Action 2a.3: Ensure information is relevant to the spatial and temporal boundaries set in 1a

The information on ecosystem components should be both relevant to the spatial and temporal boundaries that were identified in step 1a. Where possible, information should be available that is covering most of the area (with the appropriate scales of mapping within the area, see above) and the timescale should be chosen appropriately.

Action 2a.4: Conclude on all relevant ecosystem components

Fill out table 2a.4 below which concludes on all ecosystem components relevant to the SMA.

Table 2a.4 for Sicily

Ecosystem component	Relevant objective	Spatial coverage (good/poor)	Temporal coverage (good/poor)
Topography and bathymetry of the seabed	[D1] Substantial reduction (say 20%) and rationale spatial	Good	Good

	allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020		
Surface circulation pattern	[D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Poor
Predominant habitat types (benthic biocenosis): A5.39, A5.46, A5.47, A5.51, A6.31, A6.513 and A6.61	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural	Good	Good

	resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date		
Special habitat types (nurseries)	[D1] Substantial reduction (say 20%) and rationale spatial ; [D2] financial viability and safe working conditions for fishermen by 2013allocation of fishing effort by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
(Demersal) fish populations	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
FAO Geographical SubAreas	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
FAO Geographical	[D1] Substantial	Good	Good

SubAreas	reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date		
Territorial and Fisheries Limits	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
Ports (Commercial, Fishing)	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D5] Preservation of specific issues regarding the cultural heritage	Good	Good

	(say artisanal fisheries) within a given date		
Fish biodiversity	[D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
Spawning areas of target species	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Good
Petroleum and gas facilities	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem	Good	Poor

	functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date		
Shipwrecks	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013	Good	Poor
Untrawlable areas	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date; [D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date	Good	Good
Marine protected areas (MPAs)	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D2] financial viability and safe working conditions for fishermen by 2013; [D3] Nature conservation,	Good	Good

	environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date; [D5] Preservation of specific issues regarding the cultural heritage (say artisanal fisheries) within a given date		
Natura 2000 Sites of Community Importance (SCIs)	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020	Good	Good
Natura 2000 Special Protection Areas (SPAs)	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population	Good	Good

	genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020		
Specially Protected Areas of Mediterranean Importance (SPAMIs)	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020	Good	Good
Projected offshore wind farms	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction (say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date	Good	Poor
Italian continental shelf limits	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013; [D3] Nature conservation, environmental protection, and substantial reduction	Good	Good

	(say 20 %) of loss of specific biodiversity components (species richness, taxonomic structure, population genetics, architecture of trophic webs, ecosystem functionality, landscape integrity…) by 2020; [D4] Sustainable exploitation of natural resources in the face of uncertainty, multiple cumulative impacts, genetic drift and environmental variability within a given date		
Underwater cables	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013	Good	Good
Underwater pipelines	[D1] Substantial reduction (say 20%) and rationale spatial allocation of fishing effort by 2013	Good	Good

Table 2a.4 for Malta

Ecosystem component	Relevant objective	Spatial coverage (good/poor)	Temporal coverage (good/poor)
Bathymetry of the seabed		good	Not relevant
Predominant habitat types		intermediate	Intermediate
Special habitat types		Intermediate (since only few areas are covered)	Intermediate
Biological communities including phytoplankton and zooplankton communities			poor
Fish populations		GSA15	2002-ongoing (MEDITS, MEDIAS)
Protected Species			

Step 2b: Identify pressures and impacts

The aim of step 2b is to analyse the spatial overlap of the distribution pattern of the relevant natural and socio-economic ecosystem components with pressures and impacts and an assessment of potential interactions. The first action is to identify sectors, future uses and the pressures these exert on the ecosystem components identified in step 2a. Collation of spatial information on pressures and impacts via GIS is an important next step. Data may be collected from models (e.g. current speed, wave action, tidal range, distribution of nutrients, primary production etc) or by geostatistics based on a coarse sampling program (sediment, biota etc). Finally, potential cumulative impacts of pressures are identified. The final output of step 2b is a list of pressures and, depending on the availability of data, GIS maps showing their cumulative impacts on ecosystem components or a table of ecosystem component sensitivity information.

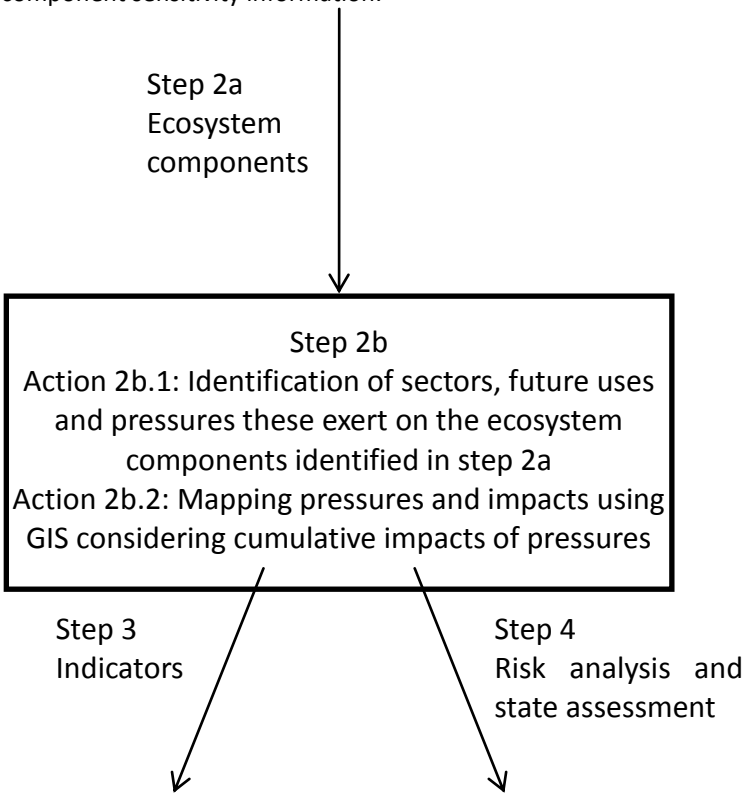


Figure 2b.1: Work flow for step 2b

Action 2b.1: Identification of sectors, future uses and pressures these exert on the ecosystem components identified in step 2a.

Sectors, activities and the pressures these exert on the ecosystem components can be identified using table 2b.1.1 **(this table is large so it will be made available on the sharepoint to accompany the manual)**. This table, taken from the MarLIN initiative (see http://www.marlin.ac.uk/maritimeactivitiesmatrix.php, for details) identifies sectors, their activities and the pressures and impacts they have on the marine environment. Using information collected in step 1 of the manual, identify from the first column in table 2b.1.1 the sectors that are relevant to the SMA. Next, identify which activities (from the second column) of each sector are carried out within the SMA. Finally, use the key to list the key pressures that are likely to be having a possible (might happen) or probable (very likely to happen) effect from that sector in the SMA. Fill out table 2b.1.2 to summarise the sectors, activities, pressures and impacts likely to be occurring in the SMA and to indicate if this is a possible or probable effect. The field "Sensitivity to human activities" provided for each European marine habitat in the MESMA Catalogue of European seabed biotopes (Deliverable D1.2) will be helpful to complete this step.

The pressure "Changes in emergence regime" is not relevant since there are very small tidal variations in central Mediterranean Sea.

Table 2b.1.2

Sector	Activity	Pressure	Probable (R) or possible (P)?
Climate change	Current change	Changes in turbifity	P*
		Displacement	R
	Temperature change	Displacement	R
		Displacement	P
Aquaculture	Fin-fish	Suspended sediment	R
		Noise disturbance	P
		Visual presence	P
		Synthetic compound contamination	R
		Changes in nutrient levels	R
Development	Construction phase	Substratum loss	R
		Smothering	R
		Suspended sediment	R
		Changes in turbidity	R
		Noise disturbance	R
		Abrasion/Physical disturbance	R
		Displacement	R
		Hydrocarbon contamination	P
	Oil and gas platforms	Changes in turbidity	R
		Noise disturbance	R
		Abrasion/Physical disturbance	R
		Hydrocarbon contamination	R
	Pipelines	Substrate loss	R*
		Smothering	R*
		Suspended sediment	R*
		Changes in turbidity	R*
	Artificial Reefs	Smothering	P
		Suspended sediment	R
		Changes in water flow rate	R
		Changes in turbidity	R
		Synthetic compound contamination	P
		Heavy metal contamination	P
		Hydrocarbon contamination	P
		Changes in nutrient levels	P
		Changes in oxygenation	P
	Communication cables	Smothering	P
		Suspended sediment	R
		Changes in water flow rate	R
		Changes in turbidity	R
		Visual presence	R
		Synthetic compound contamination	P
	Dock / port facilities	Substratum loss	R
		Smothering	R
		Suspended sediment	R
		Changes in water flow rate	R
		Changes in temperature	P
		Changes in turbidity	R
		Changes in wave exposure	R
		Noise disturbance	R

		Visual presence	R
		Abrasion / physical disturbance	R
		Displacement	R
		Synthetic compound contamination	R
		Heavy metal contamination	P
		Hydrocarbon contamination	R
		Changes in nutrient levels	R
		Changes in salinity	P
		Changes in oxygenation	R
		Introduction of microbial pathogens / parasites	R
		Introduction of non-native species	R
	Marinas	Smothering	R
		Suspended sediment	R
		Changes in water flow rate	R
		Changes in temperature	P
		Changes in turbidity	R
		Changes in wave exposure	R
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Displacement	R
		Synthetic compound contamination	R
		Heavy metal contamination	P
		Hydrocarbon contamination	R
		Changes in nutrient levels	R
		Changes in oxygenation	R
		Introduction of microbial pathogens / parasites	R
		Introduction of non-native species	R
	Oil and gas platform	smothering	R
		Suspended sediment	P
		Changes in water flow rate	R
		Changes in turbidity	R
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Synthetic compound contamination	R
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Changes in nutrient levels	P
Energy regeneration	Power station	Suspended sediment	R
		Change in temperature	R
		Change in turbidity	R
		Noise disturbance	R
		Visual presence	R
		Synthetic compound contamination	R

		Heavy metal contamination	R
		Hydro carbon contamination	P
		Changes in nutrient levels	R
		Changes in salinity	P
		Changes in oxygenation	R
Extraction	Oil and gas	Smothering	R
		Noise disturbance	R
		Visual presence	R
		Synthetic compound contamination	R
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Changes in nutrient levels	R
Fisheries / Shellfisheries	Benthic trawls	Substratum loss	R
		smothering	R
		Suspended sediment	R
		Change in turbidity	R
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Synthetic compound contamination	P
		Heavy metal contamination	P
		Displacement	R
		Hydro carbon contamination	P
		Changes in nutrient levels	R
		Selective extraction of target species	R
		Selective extraction of non-target species	R
	Netting	Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Displacement	R
		Hydrocarbon contamination	P*
		Selective extraction of target species	R
		Selective extraction of non-target species	R
	Pelagic trawls	Noise disturbance	P
		Visual presence	P
		Selective extraction of target species	R
		Selective extraction of non-target species	R
	Potting / creeling	smothering	R
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Selective extraction of target species	R

		Selective extraction of non-target species	R
Recreation	Angling	Noise disturbance	R
		Abrasion/Physical disturbance	R
		Displacement	P
		Hydrocarbon contamination	P*
		Selective extraction of target species	R
		Selective extraction of non-target species	R
	Boating / yachting	Change in turbidity	P
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Synthetic compound contamination	R
		Heavy metal contamination	P
		Hydrocarbon contamination	R
		Changes in nutrient levels	R
		Changes in oxygenation	R
		Introduction of microbial pathogens / parasites	R
		Introduction of non-native species	R
	Diving / dive sites	Smothering	R*
		Suspended sediment	R*
		Noise disturbance	R
		Abrasion/Physical disturbance	R
		Displacement	R
		Hydrocarbon contamination	P*
		Selective extraction of target species	R
		Noise disturbance	P
		Visual presence	R
Uses	Archaeology	Substratum loss	R
		Smothering	R
		Suspended sediment	R
		Change in turbidity	R
		Noise disturbance	P
		Visual presence	R
		Abrasion / physical disturbance	R
		Displacement	R
		Selective extraction of non-target species	R
		Synthetic compound contamination	P
		Hydrocarbon contamination	P
		Changes in nutrient levels	R
		Changes in oxygenation	P
	Military	Noise disturbance	R
		Abrasion/Physical disturbance	R
		Hydrocarbon contamination	P
		Selective extraction of non-target species	P*
	Mooring / beaching /	Smothering	R

	launching	Suspended sediment	R
		Changes in water flow rate	R
		Changes in turbidity	R
		Noise disturbance	R
		Light disturbance	R*
		Visual presence	R
		Abrasion / physical disturbance	R
		Synthetic compound contamination	R
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Displacement	R
		Introduction of microbial pathogens / parasites	P
		Introduction of non-native species	P
	Research	Substratum loss	P
		Noise disturbance	R
		Abrasion/Physical disturbance	R
		Displacement	P
		Hydrocarbon contamination	P
		Selective extraction of target species	R
		Selective extraction of non-target species	P
	Shipping	Suspended sediment	R
		Changes in turbidity	R
		Noise disturbance	R
		Visual presence	R
		Abrasion / physical disturbance	R
		Synthetic compound contamination	P
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Changes in oxygenation	R
		Introduction of microbial pathogens / parasites	R
		Introduction of non-native species	R
Wastes	Fishery and agriculture wastes	Smothering	R
		Suspended sediment	R
		Changes in turbidity	R
	Sewage discharge	Smothering	R
		Suspended sediment	R
		Changes in turbidity	R
		Visual presence	R
		Synthetic compound contamination	R
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Brine discharges	R*
		Changes in nutrient levels	R
		Changes in oxygenation	R
	Shipping wastes	Smothering	R
		Suspended sediment	R
		Changes in turbidity	R

		Visual presence	R
		Synthetic compound contamination	R
		Heavy metal contamination	R
		Hydro carbon contamination	R
		Changes in nutrient levels	R
		Changes in oxygenation	R
		Introduction of microbial pathogens / parasites	R
		Introduction of non-native species	R
	Spoil dumping	Smothering	R
		Suspended sediment	R
		Changes in turbidity	R
		Visual presence	R
		Synthetic compound contamination	P
		Heavy metal contamination	P
		Hydro carbon contamination	P
		Changes in nutrient levels	R
		Changes in oxygenation	R

Action 2b.2: Mapping pressures and impacts using GIS considering cumulative impacts of pressures.

In this step the spatial information on pressures and impacts is collated using GIS. It is important in this task to relate the identified pressure categories to the relevant natural ecosystem components before a more detailed spatial assessment takes place. This can be achieved via table 2b.2.1 below.

Table 2b.2.1 Estimated impacts based on expertise knowledge. Not all impacts detected in table 2b.1.2 were assessed. Natural ecosystem components pooled across substrate type. Many natural ecosystem components not included due to lack of information about spatial distribution or specific impacts

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Climate change	Current change	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of low intensity and very large extent; can trigger changes in trophic structure. Highly persistent. Little or no resilience.
Climate change	Current change	Changes in turbidity	Predominant habitat types (benthic detritic and sandy	Change in community structure. Press (chronic) impact of

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.46, A5.47, A6.31 and A6.513	low intensity and very large extent; can trigger changes in trophic structure. Highly persistent. Little or no resilience.
Climate change	Current change	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact of low intensity and very large extent; can trigger changes in trophic structure. Highly persistent. Little or no resilience.
Development	Construction phase	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impacts of high intensity and little medium extent. Little persistence and high resilience.
Development	Construction phase	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impacts of high intensity and medium extent. Medium persistence and resilience
Development	Construction phase	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impacts of high intensity and medium extent. Very large persistence and very little resilience
Development	Communication cables	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and high resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Development	Communication cables	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and moderate resilience
Development	Communication cables	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impacts of medium intensity and little extent. High persistence and little or no resilience
Development	Oil and gas platforms	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and high resilience
Development	Oil and gas platforms	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and moderate resilience
Development	Oil and gas platforms	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impacts of medium intensity and little extent. High persistence and little or no resilience
Development	Pipelines	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and high resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Development	Pipelines	Changes in turbidity	Predominant habitat types Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impacts of low intensity and little extent. High persistence and moderate resilience
Development	Pipelines	Changes in turbidity	Predominant habitat types Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impacts of medium intensity and little extent. High persistence and little or no resilience
Fisheries	Benthic trawls	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impacts of medium intensity and medium extent. Low persistence and high resilience
Fisheries	Benthic trawls	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impacts of high intensity and medium extent. Medium persistence and moderate resilience
Fisheries	Benthic trawls	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impacts of high intensity and medium extent. High persistence and little or no resilience
Recreation	Boating/yatching	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impacts of low intensity and little

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				extent. Low persistence and high resilience
Recreation	Boating/yatching	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impacts of low intensity and little extent. Low persistence and high resilience
Recreation	Boating/yatching	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impacts of low intensity and little extent. High persistence and little or no resilience
Uses	Archaeology	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impacts of medium intensity and medium extent. Medium persistence and high resilience
Uses	Archaeology	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impacts of medium intensity and medium extent. Medium persistence and high resilience
Uses	Archaeology	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impacts of high intensity and medium extent. High persistence and little or no resilience
Uses	Mooring	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impacts of medium intensity and little extent. Low persistence

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				and high resilience
Uses	Mooring	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impacts of medium intensity and little extent. Medium persistence and high resilience
Uses	Mooring	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impacts of high intensity and medium extent. High persistence and little or no resilience
Uses	Shipping	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Uses	Shipping	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Uses	Shipping	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Wastes	Fishery & agricultural w.	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Wastes	Fishery & agricultural w.	Changes in turbidity	Predominant habitat types	Change in community

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			(benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	structure. Press (chronic) impact of low intensity and large extent, except locally. Low persistence and high resilience
Wastes	Fishery & agricultural w.	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact of low intensity and large extent, except locally. Low persistence and high resilience
Wastes	Shipping wastes	Changes in turbidity	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Wastes	Shipping wastes	Changes in turbidity	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Wastes	Shipping wastes	Changes in turbidity	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact of low intensity and large extent. Low persistence and high resilience
Development	Construction phase	Substratum loss	Predominant habitat types (benthic muddy biocenosis): A5.39	Community dissapearance. Pulse impact of high intensity and localized extent. Low persistence and high resilience
Development	Construction phase	Substratum loss	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and	Community dissapearance. Pulse impact of high intensity and localized extent. Medium

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A6.513	persistence and medium resilience
Development	Construction phase	Substratum loss	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Development	Pipelines	Substrate loss	Predominant habitat types (benthic muddy biocenosis): A5.39	Community dissapearance. Pulse impact of high intensity and localized extent. Low persistence and high resilience
Development	Pipelines	Substrate loss	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Community dissapearance. Pulse impact of high intensity and localized extent. Medium persistence and medium resilience
Development	Pipelines	Substrate loss	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Fisheries	Benthic trawls	Substratum loss	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Archaeology	Substratum loss	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Research	Substratum loss	Predominant habitat types	Community dissapearance.

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			(benthic coralligenous biocenosis): A5.51 and A6.61	Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Development	Construction phase	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and large extent. Low persistence and high resilience
Development	Construction phase	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and large extent. Medium persistence and medium resilience
Development	Construction phase	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Development	Communication cables	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Development	Communication cables	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium resilience
Development	Communication cables	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				and low resilience
Development	Oil and gas platforms	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Development	Oil and gas platforms	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium resilience
Development	Oil and gas platforms	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Development	Pipelines	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Development	Pipelines	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium resilience
Development	Pipelines	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Extraction	Oil & gas	Smothering	Predominant habitat types (benthic muddy	Change in community structure. Press

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.39	(chronic) impact of low to medium intensity and medium extent. Low persistence and high resilience
Extraction	Oil & gas	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact of medium to high intensity and medium extent. Medium persistence and medium resilience
Extraction	Oil & gas	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Fisheries	Benthic trawls	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of high intensity and medium extent. Low persistence and high resilience
Fisheries	Benthic trawls	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact of high intensity and medium extent. Medium persistence and medium resilience
Fisheries	Benthic trawls	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure that can lead to community dissapearance. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Recreation	Diving/dive site	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Diving/dive site	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low to medium intensity and localized extent. Medium persistence and medium resilience
Recreation	Diving/dive site	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Uses	Archaeology	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Uses	Archaeology	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low to medium intensity and localized extent. Medium persistence and medium resilience
Uses	Archaeology	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Uses	Mooring/beaching	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				localized extent. Low persistence and high resilience
Uses	Mooring/beaching	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low to medium intensity and localized extent. Medium persistence and medium resilience
Uses	Mooring/beaching	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Wastes	Fishery & agricultural w.	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Wastes	Fishery & agricultural w.	Smothering	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low to medium intensity and localized extent. Medium persistence and medium resilience
Wastes	Fishery & agricultural w.	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Wastes	Shipping wastes	Smothering	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Wastes	Shipping wastes	Smothering	Predominant habitat types	Change in community

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			(benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	structure. Pulse impact of low to medium intensity and localized extent. Medium persistence and medium resilience
Wastes	Shipping wastes	Smothering	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and localized extent. High persistence and low resilience
Development	Construction phase	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and large extent. Low persistence and high resilience
Development	Construction phase	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium to high intensity and large extent. Medium to high persistence and medium to low resilience
Development	Construction phase	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Community dissapearance. Pulse impact of high intensity and large extent. High persistence and low or no resilience
Development	Communication cables	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Development	Communication cables	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis):	Change in community structure. Pulse impact of medium intensity and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.46, A5.47, A6.31 and A6.513	localized extent. Medium persistence and medium resilience
Development	Communication cables	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of medium to high intensity and localized extent. Low to medium persistence and low to medium resilience
Development	Pipelines	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and medium to large extent. Low persistence and high resilience
Development	Pipelines	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and medium to large extent. Medium persistence and medium resilience
Development	Pipelines	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and medium to large extent. Large persistence and low or no resilience
Fisheries	Benthic trawls	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and medium extent. Low persistence and high resilience
Fisheries	Benthic trawls	Suspended sediment	Predominant habitat types	Change in community

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			(benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	structure. Pulse medium intensity and medium extent. Medium persistence and medium resilience
Fisheries	Benthic trawls	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of medium intensity and medium extent. Large persistence and low or no resilience
Recreation	Diving/dive site	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Diving/dive site	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Recreation	Diving/dive site	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and localized extent. Large persistence and low resilience
Uses	Archaeology	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and medium extent. Low persistence and high resilience
Uses	Archaeology	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47,	Change in community structure. Pulse impact of medium intensity and medium extent.

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A6.31 and A6.513	Medium persistence and medium resilience
Uses	Archaeology	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and medium extent. Large persistence and low resilience
Uses	Mooring/beaching	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Uses	Mooring/beaching	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium resilience
Uses	Mooring/beaching	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and localized extent. Large persistence and low resilience
Uses	Shipping	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and medium extent. Low persistence and high resilience
Uses	Shipping	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and medium extent. Medium persistence and medium resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Uses	Shipping	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and medium extent. Large persistence and low resilience
Wastes	Fishery & agricultural w.	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and large extent. Low persistence and high resilience
Wastes	Fishery & agricultural w.	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and large extent. Medium persistence and medium resilience
Wastes	Fishery & agricultural w.	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and large extent. Large persistence and low resilience
Wastes	Shipping wastes	Suspended sediment	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of medium intensity and large extent. Low persistence and high resilience
Wastes	Shipping wastes	Suspended sediment	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of medium intensity and large extent. Medium persistence and medium resilience
Wastes	Shipping wastes	Suspended sediment	Predominant habitat types (benthic coralligenous biocenosis):	Change in community structure. Pulse impact of high

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.51 and A6.61	intensity and large extent. Large persistence and low resilience
Development	Construction phase	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Disorientation in mammals and possibly also in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Development	Construction phase	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Disorientation in mammals and possibly also in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Development	Construction phase	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Disorientation in mammals and possibly also in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				unknown chronic effects
Development	Oil and gas platforms	Noise disturbance (including sub-surface exploration air guns)	Predominant habitat types (benthic muddy biocenosis): A5.39	Disorientation, damage or death in mammals. Damage or death in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and low but variable resilience (on depending of the focused taxa)
Development	Oil and gas platforms	Noise disturbance (including sub-surface exploration air guns)	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Disorientation, damage or death in mammals. Damage or death in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and low but variable resilience (on depending of the focused taxa)
Development	Oil and gas platforms	Noise disturbance (including sub-surface exploration air guns)	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Disorientation, damage or death in mammals. Damage or death in fishes and cephalopods. Pulse impact of medium intensity and large extent (on depending on the focused taxa). Low but variable persistence and variable resilience (on depending of the focused taxa)
Extraction	Oil & gas	Noise disturbance	Predominant habitat types (benthic muddy biocenosis):	Disorientation in mammals and possibly also in fishes and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.39	cephalopods. Press (chronic) impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Extraction	Oil & gas	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Disorientation in mammals and possibly also in fishes and cephalopods. Press (chronic) impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Extraction	Oil & gas	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Disorientation in mammals and possibly also in fishes and cephalopods. Press (chronic) impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Fisheries	Benthic trawls	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Disorientation in mammals and possibly also in fishes and cephalopods. Changes in behaviour of motile animals. Press (chronic) impact of medium intensity and large extent (on depending on the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				focused taxa). Low persistence and high resilience, but unknown chronic effects
Fisheries	Benthic trawls	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Disorientation in mammals and possibly also in fishes and cephalopods. Changes in behaviour of motile animals. Press (chronic) impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Fisheries	Benthic trawls	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Disorientation in mammals and possibly also in fishes and cephalopods. Changes in behaviour of motile animals. Press (chronic) impact of medium intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Fisheries	Netting	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Fisheries	Netting	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Fisheries	Netting	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Angling	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Angling	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Angling	Noise disturbance	Predominant habitat types (benthic coralligenous	Changes in behaviour of motile animals. Pulse impact of

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.51 and A6.61	low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Boating/yatching	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Boating/yatching	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Boating/yatching	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Diving/dive site	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				unknown chronic effects
Recreation	Diving/dive site	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Recreation	Diving/dive site	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Pulse impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Uses	Archaeology	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Archaeology	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Archaeology	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the focused taxa). Low

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				persistence and high resilience
Uses	Military	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Disorientation, damage or death in mammals. Lack of data about other taxa. Pulse impact of high intensity and large extent (on depending on the focused taxa). Variable persistence and variable resilience (on depending of the focused taxa)
Uses	Military	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Disorientation, damage or death in mammals. Lack of data about other taxa. Pulse impact of high intensity and large extent (on depending on the focused taxa). Variable persistence and variable resilience (on depending of the focused taxa)
Uses	Military	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Disorientation, damage or death in mammals. Lack of data about other taxa. Pulse impact of high intensity and large extent (on depending on the focused taxa). Variable persistence and variable resilience (on depending of the focused taxa)
Uses	Mooring/beaching	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				focused taxa). Low persistence and high resilience
Uses	Mooring/beaching	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Mooring/beaching	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Pulse impact of low intensity and medium extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Research	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Pulse impact of low intensity and small extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Research	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Pulse impact of low intensity and small extent (on depending on the focused taxa). Low persistence and high resilience
Uses	Research	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Pulse impact of low intensity and small extent (on depending on the focused taxa). Low persistence and high resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Uses	Shipping	Noise disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Uses	Shipping	Noise disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Uses	Shipping	Noise disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in behaviour of motile animals. Press (chronic) impact of low intensity and large extent (on depending on the focused taxa). Low persistence and high resilience, but unknown chronic effects
Development	Construction phase	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Habitat loss and environmental change. Changes in the structure of nearby communities. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Development	Construction phase	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic	Habitat loss and environmental change. Changes in

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	the structure of nearby communities. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Development	Construction phase	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Habitat loss and environmental change. Changes in the structure of nearby communities. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Development	Oil and gas platforms	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Habitat loss and environmental change. Changes in the structure of nearby communities. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Development	Oil and gas platforms	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Habitat loss and environmental change. Changes in the structure of nearby communities. Press (chronic) impact of high intensity and localized extent. High persistence and low resilience
Development	Oil and gas platforms	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Habitat loss and environmental change. Changes in the structure of nearby communities. Press (chronic) impact of high

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				intensity and localized extent. High persistence and low resilience
Fisheries	Benthic trawls	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact of medium (diffused) intensity and localized extent. Low persistence and high resilience
Fisheries	Benthic trawls	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact of medium (diffused) intensity and localized extent. Medium persistence and medium resilience
Fisheries	Benthic trawls	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact of medium (diffused) intensity and localized extent. High persistence and low resilience
Fisheries	Netting	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in surface community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Fisheries	Netting	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Loss of erect habitat-forming species. Change in community structure. Pulse impact of low to medium intensity (depending of the focused taxa) and localized extent. Low to medium persistence and medium resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Fisheries	Netting	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Change in community structure. Pulse impact of medium intensity and localized extent. High persistence and low resilience
Recreation	Angling	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in surface community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Angling	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Loss of erect habitat-forming species. Change in community structure. Pulse impact of low to medium intensity (depending of the focused taxa) and localized extent. Low to medium persistence and medium resilience
Recreation	Angling	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Change in community structure. Pulse impact of medium intensity and localized extent. High persistence and low resilience
Recreation	Boating/yatching	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Virtually absent in deep bottoms
Recreation	Boating/yatching	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and	Virtually absent in deep bottoms

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A6.513	
Recreation	Boating/yatching	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Virtually absent in deep bottoms
Recreation	Diving/dive site	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in surface community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Diving/dive site	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Loss of erect habitat-forming species. Change in community structure. Pulse impact of low to medium intensity (depending of the focused taxa) and localized extent. Low to medium persistence and medium resilience
Recreation	Diving/dive site	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Change in community structure. Pulse impact of medium intensity and localized extent, but can be locally heavy in intensity. High persistence and low resilience
Uses	Archaeology	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Loss of substrate. Change in community structure. Pulse impact of high intensity and localized extent. Medium persistence and high resilience
Uses	Archaeology	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic	Loss of substrate. Change in community

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	structure. Pulse impact of high intensity and localized extent. Medium persistence and medium resilience
Uses	Archaeology	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of substrate. Change in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience
Uses	Military	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Unknown
Uses	Military	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Unknown
Uses	Military	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Unknown
Uses	Mooring/beaching	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in surface community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Uses	Mooring/beaching	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low to medium intensity (depending of the focused taxa) and localized extent. Low to medium persistence and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				medium resilience
Uses	Mooring/beaching	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Change in community structure. Pulse impact of high intensity and localized extent, but can be locally heavy in intensity. High persistence and low resilience
Uses	Research	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Uses	Research	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Pulse impact of low intensity and localized extent. Low persistence and medium resilience
Uses	Research	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of high intensity and localized extent. Medium persistence and low resilience
Uses	Shipping	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Pulse impact of variable intensity in shallow waters (port facilities and neighbourhoods) and localized extent. Low persistence and high resilience
Uses	Shipping	Abrasion/Physical	Predominant	Change in

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
		disturbance	habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	community structure. Pulse impact of variable intensity in shallow waters (port facilities and neighbourhoods) and localized extent. Low persistence and medium resilience
Uses	Shipping	Abrasion/Physical disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Pulse impact of variable intensity in shallow waters (port facilities and neighbourhoods) and localized extent. Medium persistence and low resilience
Wastes	Brine discharges	Abrasion/Physical disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Potential fisiological stress to many organisms. Probable changes in community structure. Press (chronic) impact of variable intensity and large extent. Effects and persistence largely unknown. High expected resilience
Wastes	Brine discharges	Abrasion/Physical disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Potential fisiological stress to many organisms. Probable changes in community structure. Press (chronic) impact of variable intensity and large extent. Effects and persistence largely unknown. Medium expected resilience
Wastes	Brine discharges	Abrasion/Physical disturbance	Predominant habitat types	Potential

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			(benthic coralligenous biocenosis): A5.51 and A6.61	fisiological stress to many organisms. Probable changes in community structure. Press (chronic) impact of variable intensity and large extent. Effects and persistence largely unknown. Low expected resilience
Climate change	Current change	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Possible decoupling between pelagic and benthic foods webs. Changes in colonization rates by current-borned exotic species. Expected changes in the structure of communities. Press (chronic) impact of low intensity and large extent. High persistence and low or null resilience
Climate change	Current change	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Possible decoupling between pelagic and benthic foods webs. Changes in colonization rates by current-borned exotic species. Expected changes in the structure of communities. Press (chronic) impact of low intensity and large extent. High persistence and low or null resilience
Climate change	Current change	Displacement	Predominant habitat types (benthic coralligenous biocenosis):	Possible decoupling between pelagic and benthic foods webs. Changes in

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.51 and A6.61	colonization rates by current-borned exotic species. Expected changes in the structure of communities. Press (chronic) impact of low intensity and large extent. High persistence and low or null resilience
Development	Construction phase	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Habitat modificiation. Changes in community structure. Pulse impact of high intensity and localized extent. Medium persistence and medium resilience
Development	Construction phase	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Habitat modificiation. Changes in community structure. Pulse impact of high intensity and localized extent. Medium persistence and medium resilience
Development	Construction phase	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Habitat modificiation. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience
Fisheries	Benthic trawls	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Habitat modificiation. Changes in community structure. Pulse impact of high intensity and localized extent. Low persistence

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				and high resilience
Fisheries	Benthic trawls	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Habitat modificiation and loss of erect species. Changes in community structure. Pulse impact of high intensity and localized extent. Medium persistence and medium resilience
Fisheries	Benthic trawls	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Habitat loss. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience
Fisheries	Netting	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Surface habitat modificiation. Changes in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Fisheries	Netting	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Surface habitat modificiation and loss of erect species. Changes in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium resilience
Fisheries	Netting	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Habitat loss. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Recreation	Angling	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Surface habitat modificiation. Changes in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Angling	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Surface habitat modificiation and loss of erect species. Changes in community structure. Pulse impact of low intensity and localized extent. Medium persistence and medium to high resilience
Recreation	Angling	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience
Recreation	Diving/dive site	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Surface habitat modificiation. Changes in community structure. Pulse impact of low intensity and localized extent. Low persistence and high resilience
Recreation	Diving/dive site	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Surface habitat modificiation and loss of erect species. Changes in community structure. Pulse impact of low intensity and localized extent. Medium persistence and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				medium to high resilience
Recreation	Diving/dive site	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of erect habitat-forming species. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low resilience
Uses	Archaeology	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Loss of substrate. Changes in community structure. Pulse impact of high intensity and localized extent. Medium to low persistence and high resilience
Uses	Archaeology	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Loss of substrate and erect species. Changes in community structure. Pulse impact of high intensity and localized extent. Medium persistence and medium to high resilience
Uses	Archaeology	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of substrate and habitat-forming species. Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Mooring/beaching	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
Uses	Mooring/beaching	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium to high resilience
Uses	Mooring/beaching	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Research	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of medium intensity and localized extent. Low persistence and high resilience
Uses	Research	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Pulse impact of medium intensity and localized extent. Medium persistence and medium to high resilience
Uses	Research	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Shipping	Displacement	Predominant habitat types (benthic muddy biocenosis): A5.39	Displacement of pelagic propagules as ballast water and fouling organisms onto the hulls. Change in community structure. Press

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				(chronic) impact of low intensity and large extent. In few cases the impact reaches high persistence and low resilience
Uses	Shipping	Displacement	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Displacement of pelagic propagules as ballast water and fouling organisms onto the hulls. Change in community structure. Press (chronic) impact of low intensity and large extent. In few cases the impact reaches high persistence and low resilience
Uses	Shipping	Displacement	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Displacement of pelagic propagules as ballast water and fouling organisms onto the hulls. Change in community structure. Press (chronic) impact of low intensity and large extent. In few cases the impact reaches high persistence and low resilience
Development	Construction phase	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation.
Development	Construction phase	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis):	Change in community structure. Press (chronic) impact from leaking,

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.46, A5.47, A6.31 and A6.513	usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Development	Construction phase	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Development	Oil and gas platforms	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Development	Oil and gas platforms	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Development	Oil and gas platforms	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				fractionation
Extraction	Oil & gas	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Extraction	Oil & gas	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Extraction	Oil & gas	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Benthic trawls	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Benthic trawls	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy	Change in community structure. Press (chronic) impact

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.46, A5.47, A6.31 and A6.513	from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Benthic trawls	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Netting	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Netting	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Fisheries	Netting	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				oil origin and fractionation
Recreation	Angling	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Angling	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Angling	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Boating/yatching	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Boating/yatching	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy	Change in community structure. Press (chronic) impact

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.46, A5.47, A6.31 and A6.513	from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Boating/yatching	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Diving/dive site	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Diving/dive site	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Recreation	Diving/dive site	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				oil origin and fractionation
Uses	Archaeology	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Archaeology	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Archaeology	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Military	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Military	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy	Change in community structure. Press (chronic) impact

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.46, A5.47, A6.31 and A6.513	from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Military	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Mooring/beaching	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Mooring/beaching	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Mooring/beaching	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				oil origin and fractionation
Uses	Research	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Research	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Research	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Shipping	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Shipping	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy	Change in community structure. Press (chronic) impact

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			biocenosis): A5.46, A5.47, A6.31 and A6.513	from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Uses	Shipping	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Wastes	Shipping wastes	Hydrocarbon contamination	Predominant habitat types (benthic muddy biocenosis): A5.39	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Wastes	Shipping wastes	Hydrocarbon contamination	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the oil origin and fractionation
Wastes	Shipping wastes	Hydrocarbon contamination	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Change in community structure. Press (chronic) impact from leaking, usually diffuse and of large extent. Variable toxicity and persistence on depending of the

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				oil origin and fractionation
Fisheries	Benthic trawls	Selective extraction of target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed populations
Fisheries	Benthic trawls	Selective extraction of target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed populations
Fisheries	Benthic trawls	Selective extraction of target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed populations
Fisheries	Netting	Selective extraction of target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed populations
Fisheries	Netting	Selective extraction of target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				populations
Fisheries	Netting	Selective extraction of target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can lead to the fuctional extinction of collapsed populations
Recreation	Angling	Selective extraction of target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Press (chronic) impact of largely unknown intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can selectively remove the largest reproductive individuals
Recreation	Angling	Selective extraction of target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Press (chronic) impact of largely unknown intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators.

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				Medium persistence and medium resilience, but in some cases can selectively remove the largest reproductive individuals
Recreation	Angling	Selective extraction of target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Press (chronic) impact of largely unknown intensity and large extent through direct and indirect cascading effects of the removal of targeted top predators. Medium persistence and medium resilience, but in some cases can selectively remove the largest reproductive individuals
Recreation	Diving/dive site	Selective extraction of target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of low intensity and localized extent in this biocenosis. Medium persistence and medium resilience, but in some cases can significantly decrease abundance of sensible species
Recreation	Diving/dive site	Selective extraction of target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Pulse impact of low intensity and localized extent in this biocenosis. Medium persistence and medium resilience, but in some cases

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				can significantly decrease abundance of sensible species
Recreation	Diving/dive site	Selective extraction of target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of largely unknown intensity and localized extent in this biocenosis. Medium persistence and medium resilience, but in some cases can significantly decrease abundance of sensible species like gorgonians, corals and large bivalves
Uses	Research	Selective extraction of target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence and high resilience
Uses	Research	Selective extraction of target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence and high resilience
Uses	Research	Selective extraction of target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence and high resilience
Fisheries	Benthic trawls	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				mortality and altered interactions and their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic relevance of non-target species
Fisheries	Benthic trawls	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct mortality and altered interactions and their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic relevance of non-target species
Fisheries	Benthic trawls	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct mortality and altered interactions and their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				relevance of non-target species
Fisheries	Netting	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct mortality and altered interactions and their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic relevance of non-target species
Fisheries	Netting	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct mortality and altered interactions and their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic relevance of non-target species
Fisheries	Netting	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Press (chronic) impact of high intensity and large extent through direct mortality and altered interactions and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
				their strenghts. Medium persistence and medium resilience, but in some cases can lead to deep functional changes in the size spectra and trophic relevance of non-target species
Recreation	Angling	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of largely largely unknown intensity and potentially large extent. Medium persistence and medium resilience, but in some cases can lead to strong functional effects
Recreation	Angling	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in community structure. Pulse impact of largely largely unknown intensity and potentially large extent. Medium persistence and medium resilience, but in some cases can lead to strong functional effects
Recreation	Angling	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of largely largely unknown intensity and potentially large extent. Medium persistence and medium resilience, but in some cases can lead to strong functional effects
Uses	Archaeology	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis):	Loss of the pristine community. Pulse impact of high intensity and

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A5.39	localized extent. Low persistence and high resilience
Uses	Archaeology	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Loss of the pristine community. Pulse impact of high intensity and localized extent. Medium to low persistence and medium to high resilience
Uses	Archaeology	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Loss of the pristine community. Pulse impact of high intensity and localized extent. High persistence and low or no resilience
Uses	Military	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Unknown
Uses	Military	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Unknown
Uses	Military	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Unknown
Uses	Research	Selective extraction of non-target species	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence and high resilience
Uses	Research	Selective extraction of non-target species	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence

Sector	Activity	Pressure	Relevant natural ecosystem component	Impact (adverse affects). Persistence and resilience
			A6.513	and high resilience
Uses	Research	Selective extraction of non-target species	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in community structure. Pulse impact of low intensity and localized extent. low persistence and high resilience
Uses	Mooring/beaching/coastal and off-shore facilities	Light disturbance	Predominant habitat types (benthic muddy biocenosis): A5.39	Changes in the behaviour of certain species; extended foraging times of visual predators; concentration of certain species. Community effects unknown
Uses	Mooring/beaching/coastal and off-shore facilities	Light disturbance	Predominant habitat types (benthic detritic and sandy biocenosis): A5.46, A5.47, A6.31 and A6.513	Changes in the behaviour of certain species; extended foraging times of visual predators; concentration of certain species. Community effects unknown
Uses	Mooring/beaching/coastal and off-shore facilities	Light disturbance	Predominant habitat types (benthic coralligenous biocenosis): A5.51 and A6.61	Changes in the behaviour of certain species; extended foraging times of visual predators; concentration of certain species. Community effects unknown

First generic pressure maps need to be produced in GIS accounting for the footprint and intensity of the human activities. The footprint of an activity is the actual area affected by the activity.

Good information

First, collate GIS maps for all activities in vector format. For all human activities the footprint and intensity in relation to the spatial and temporal scales of the assessment should be determined. For instance cables and pipelines can be associated with a certain width, or a demersal fishing track creates a certain footprint on the seabed. Using the standard buffer tool in GIS, convert line and points maps which reflect the footprint and intensity of the human activities to polygons.

Using the information in table 2b.2.1 identify which activities exert the same generic pressure on the natural ecosystem components. GIS layers for these activities should be merged into single pressure layers. A vector grid with an adequate cell size reflecting a good compromise between the spatial resolution of the data used and the scale of the SMA should be superimposed onto the merged activities layer. This allows us to summarise the proportion of each grid cell affected by the footprint and/ or intensity of all the human activities exerting the same pressure and to produce respective pressure maps.
Fill out table 2b.2.2 to summarise these pressure, activities and the proportion of the SMA affected.

Table 2b.2.2 for Malta

Pressure	Activities which contribute to that pressure	Proportion of SMA affected by pressure (P)
Substratum loss	Dock/port facilities, benthic trawls, archaeology.	0.06%
Smothering	Artificial reefs, communication cables, dock/port facilities, marinas, oil and gas platform, benthic trawls, potting/creeling, archaeology, mooring, fishery and agriculture wastes, sewage discharge, shipping wastes, spoil dumping	0.9%
Suspended sediment	Fin-fish, artificial reefs, communication cables, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, archaeology, mooring, shipping, fishery and agriculture wastes, sewage discharge, shipping wastes, spoil dumping	1.2%
Changes in water flow rate	Artificial reefs, communication cables, dock/port facilities, marinas, oil and gas platform, mooring.	
Changes in temperature	Dock/port facilities, marinas, power station,	
Changes in turbidity	Artificial reefs, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, archaeology, mooring, shipping, fishery and agriculture wastes, sewage discharge, shipping wastes, spoil dumping	
Changes in wave exposure	Dock/port facilities, marinas?	
Noise disturbance	Fin-fish, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, netting, pelagic trawls, potting, dive sites, archaeology, mooring, shipping	
Visual presence	Fin-fish, communication cables, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, netting, pelagic trawls, potting, dive sites? Archaeology, mooring, shipping, sewage discharge, shipping wastes, spoil dumping	

Abrasion / physical disturbance	Dock/port facilities, marinas, oil and gas platform, benthic trawls, netting, potting/creeling, archaeology, mooring, shipping	
Displacement	Dock/port facilities, marinas?	
Synthetic compound contamination	Fin-fish, artificial reefs, communication cables?, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls?, archaeology, mooring, shipping, sewage discharge, shipping wastes, spoil dumping,	
Heavy metal contamination	Artificial reefs, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, mooring, shipping, sewage discharge, shipping wastes, spoil dumping	
Hydrocarbon contamination	Artificial reefs, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, archaeology, mooring, shipping, sewage discharge, shipping wastes, spoil dumping	
Changes in nutrient levels	Fin-fish, artificial reefs, dock/port facilities, marinas, oil and gas platform, power station, benthic trawls, archaeology, sewage discharge, shipping wastes, spoil dumping	
Changes in salinity	dock/port facilities, power station,	
Changes in oxygenation	Artificial reefs, dock/port facilities, marinas, power station, archaeology, shipping, sewage discharge, shipping wastes, spoil dumping	
Introduction of microbial pathogens/parasites	dock/port facilities, marinas, mooring, shipping, shipping wastes,	
Introduction of non-native species	dock/port facilities, marinas, mooring, shipping, shipping wastes,	
Selective extraction of target species	benthic trawls, netting, pelagic trawls, potting/creeling	
Selective extraction of non-target species	benthic trawls, netting, pelagic trawls, potting/creeling	

Create a GIS raster layer of the pressures where the value in each cell is the proportion of grid cell affected by the pressure (P).

Next the sensitivity of each ecosystem component to the human pressure should be determined. The measure of sensitivity should account for the resistance and resilience and there are many examples in the literature for determining this. As an example the MarLIN sensitivity rationale (http://www.marlin.ac.uk/sensitivityrationale.php) uses intolerance and recoverability and combines these as shown in table 2b.2.3 to define sensitivity. MarLIN also provides an online database of habitat and species sensitivity values to the range of pressures listed in table 2b.1.1.

Table 2b.2.3: Combining 'intolerance' and 'recoverability' assessments to determine 'sensitivity'. NS = not sensitive, NR = not relevant taken from http://www.marlin.ac.uk/sensitivityrationale.php

		Recoverability						
		None	Very low (>25 yr.)	Low (>10/25 yr.)	Moderate (>5 -10 yr.)	High (1 -5 yr.)	Very high (<1 yr.)	Immediate (< 1 week)
Intolerance	High	Very high	Very high	High	Moderate	Moderate	Low	Very low
	Intermediate	Very high	High	High	Moderate	Low	Low	Very Low
	Low	High	Moderate	Moderate	Low	Low	Very Low	NS
	Tolerant	NS	NS	NS	NS	NS	NS	NS
	Tolerant*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
	Not relevant	NR	NR	NR	NR	NR	NR	NR

This measure of sensitivity should be outlined in detail and summarised in table 2b.2.4 by listing natural ecosystem components along the column headings and the human pressures along the row headings and filling in the sensitivity information for each ecosystem component on each pressure.

Table 2b.2.4 for Malta

Human pressures		Ecosystem components					
		Bathymetry of the seabed	Predominant habitat types	Special habitat types	Biological communities including phytoplankton and zooplankton	Fish population	Protected species
	Substratum loss	No	high	high	medium	low	low
	Smothering	low	Medium	high	Low	low	low
	Suspended sediment	no	Low	low	medium	medium	medium
	Changes in water flow rate	no	medium	medium	Medium	Medium	medium
	Changes in temperature	no	high	high	Medium	medium	medium
	Changes in turbidity	no	low	medium	high	High	High
	Changes in wave exposure	no	medium	medium	medium	medium	Medium
	Noise disturbance	no	no	no	low	medium	Medium
	Visual presence	no	no	no	low	medium	Medium
	Abrasion / physical disturbance	medium	high	high	low	medium	Medium
	Displacement	low	high	high	low	medium	Medium
	Synthetic compound contamination	no	High	High	High	Medium	medium
	Heavy metal metal contaminatio	no	high	high	medium	high	high

	n						
	Hydro carbon contaminatio n	no	high	high	medium	high	high
	Changes in nutrient levels	no	low	mediu m	medium	high	high
	Changes in salinity	no	medium	mediu m	medium	High	High
	Changes in oxygenation	no	medium	mediu m	medium	High	High
	Introduction of microbial pathogens parasites	no	medium	mediu m	medium	High	High
	Introduction of non-native species	no	low	mediu m	high	High	High
	Selective extraction of target species	no	medium	mediu m	Medium	Mediu m	Medium
	Selective extraction of non – target species	no	medium	mediu m	medium	medium	medium

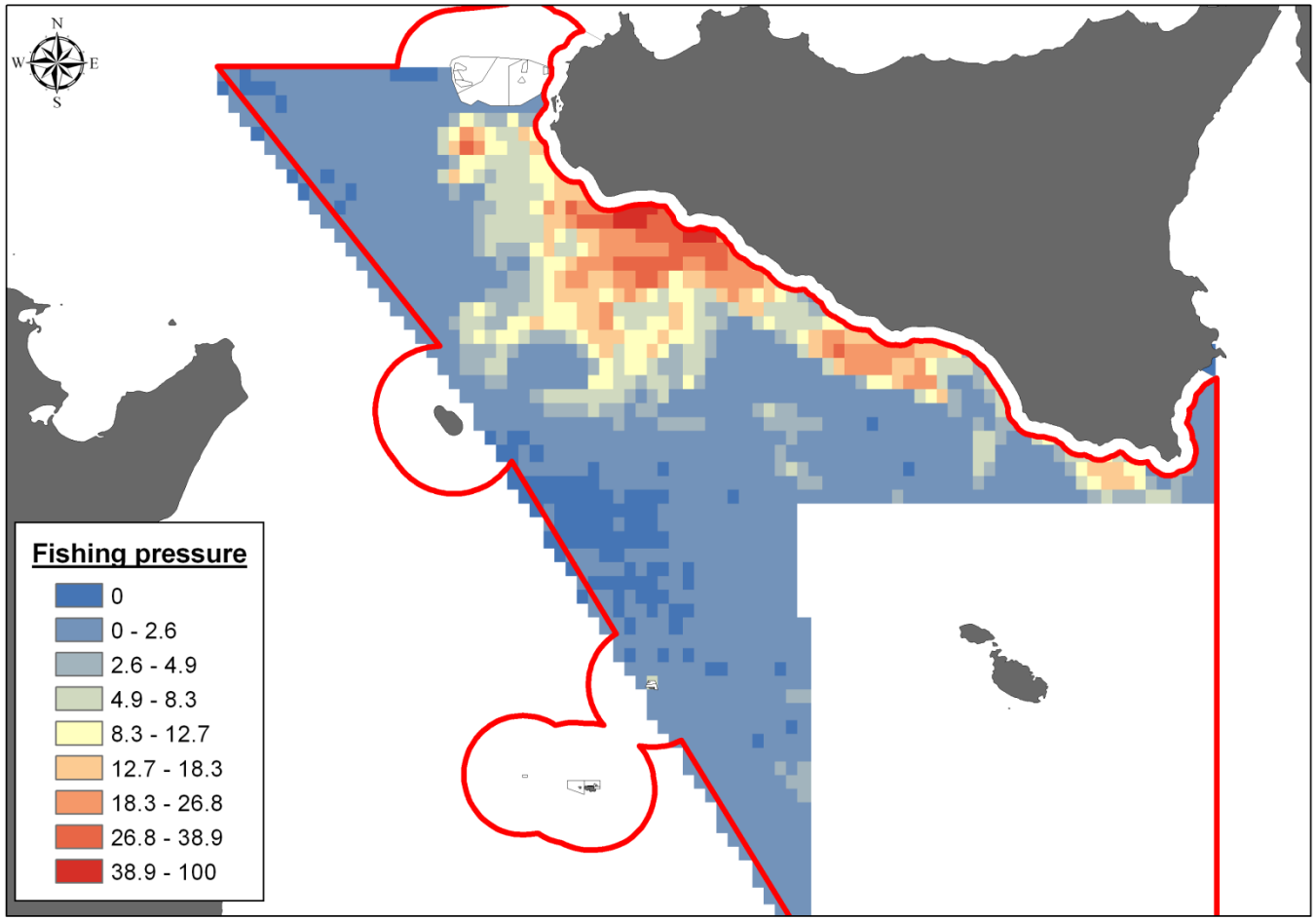
To map the impact of those pressures the measure of sensitivity needs to be converted from an ordinate scale to a numeric measure for sensitivity. The values are as follows: 0 (no), 0.2 (low), 0.6 (medium), and 1 (high). Create a GIS raster layer of sensitivity information for ecosystem components where the sensitivity (S) for each raster cell is the numeric measure above for each of the sensitivities listed in table 2b.2.4.

To create a pressure impact layer the impact of a given pressure for each raster cell can be computed as:

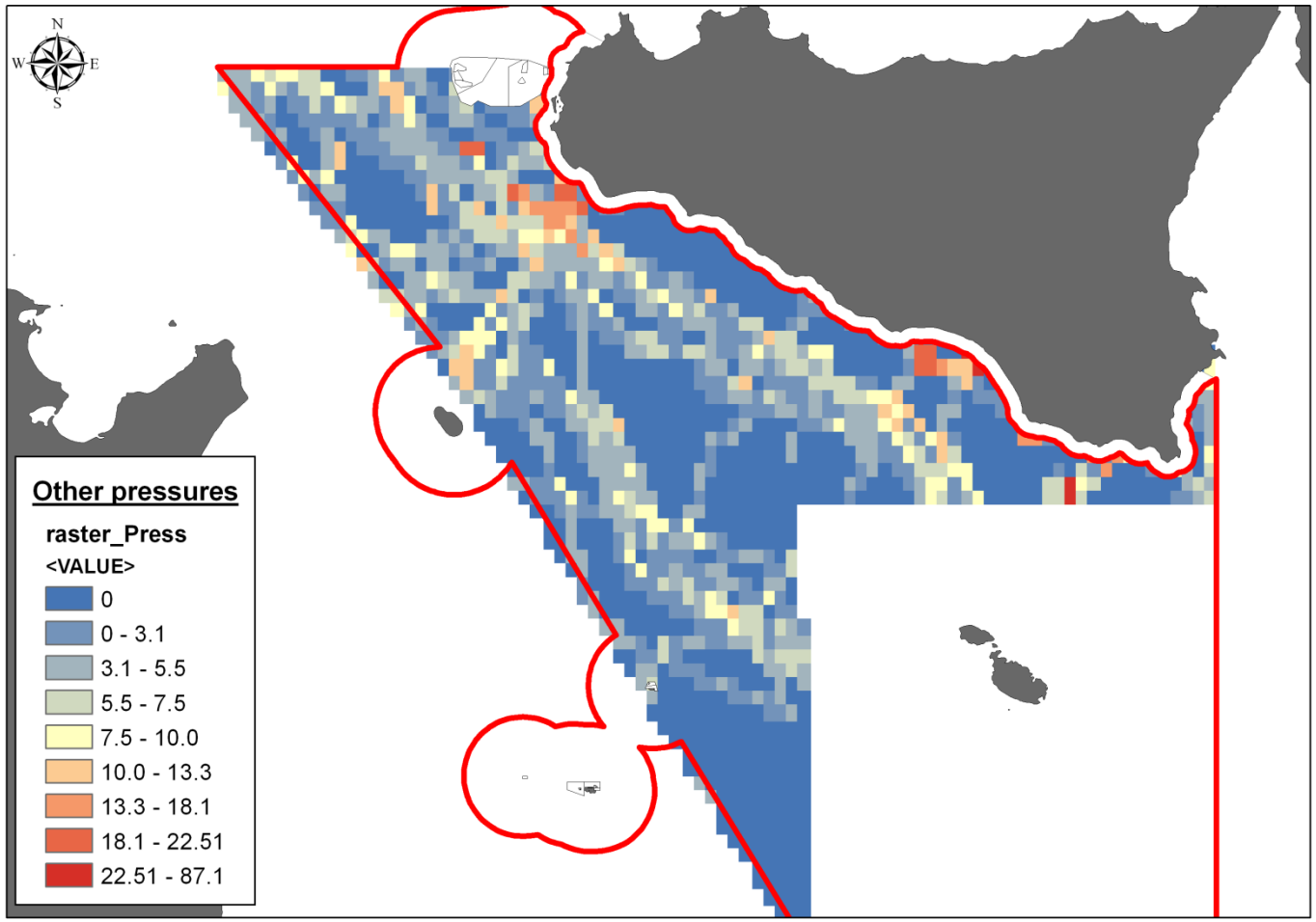
$$I_i = P_i \cdot S_{ij}$$

With P_i as the measure a pressure (i = 1, 2,…n) and S the sensitivity measure j (j = 1, 2,…m) of a component for the given pressure P_i.

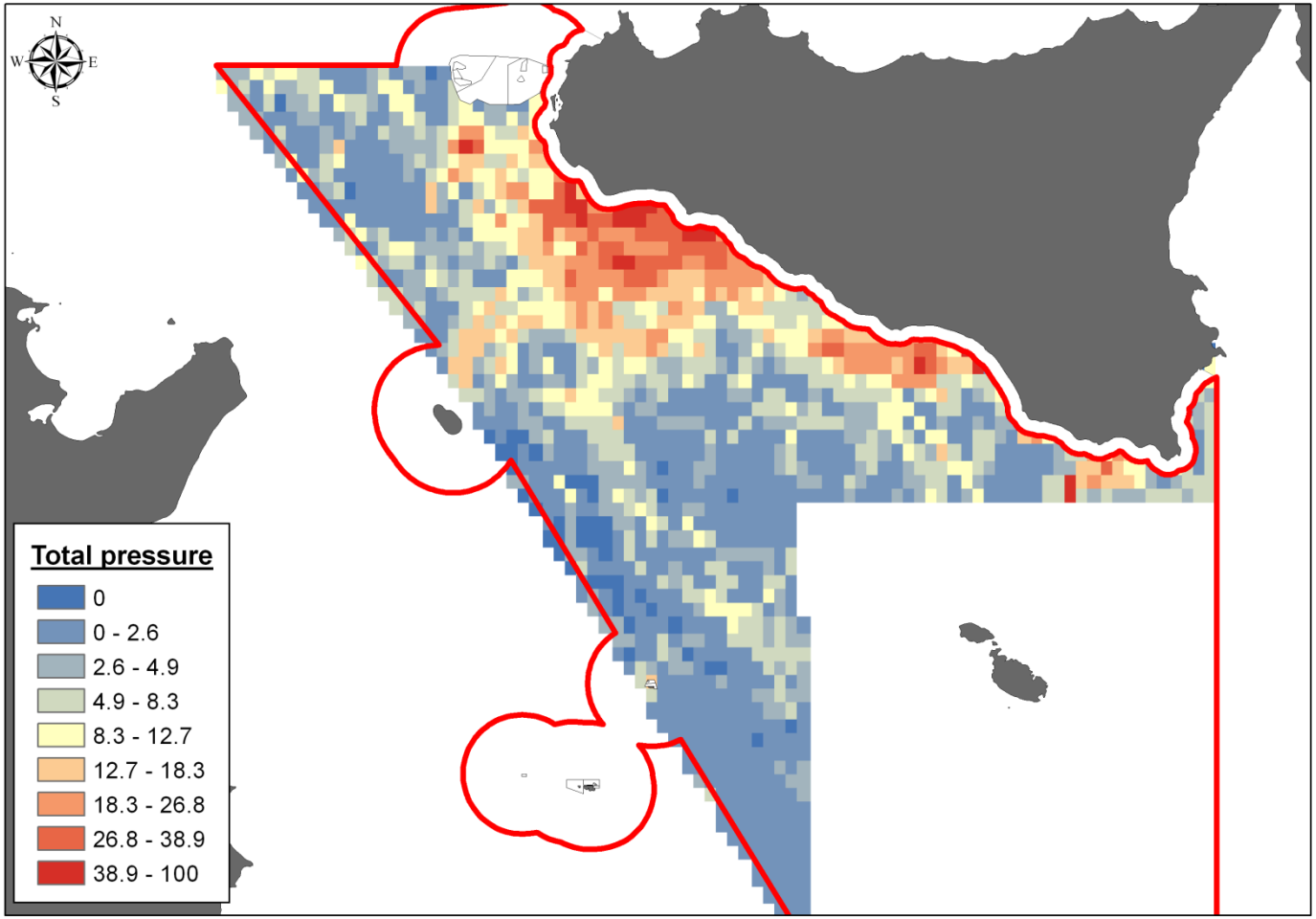
Map of the spatial distribution of trawl-fishing pressure.



Map of the spatial distribution of pressures other than trawl-fishing.



Map of the spatial distribution of the accumulated human pressures



Intermediate information

Similar to good data, in cases where the geodata of human activities have been generated with expert knowledge, the activity data should be merged by the generic pressure categories. A vector grid with an adequate cell size reflecting a good comprise between the spatial resolution of the data used and the scale of the SMA should be superimposed onto the merged activities layer. This allows to summarise the proportion of a grid cell affected by the footprint and/ or intensity of all the human activities exerting the same pressure and to produce respective pressure maps.

The sensitivity of each ecosystem component to the human pressure categories should be determined and summarised in table 2b.2.5. This may be limited to expert judgement.

Table 2b.2.5

		Ecosystem components		
Human pressures				

To map the impact of those pressures the measure of sensitivity needs to be converted from an ordinate scale to a numeric measure for sensitivity. The values are as follows: 0 (no), 0.2 (low), 0.6 (medium), and 1 (high). Create a GIS raster layer of sensitivity information for ecosystem components where the sensitivity (S) for each raster cell is the numeric measure above for each of the sensitivities listed in table 2b.2.4.
To create an pressure impact layer the impact of a given pressure for each raster cell can be computed as:

$$I_i = P_i \cdot S_{ij}$$

With P_i as the measure a pressure (i = 1, 2,…n) and S the sensitivity measure j (j = 1, 2,…m) of a component for the given pressure P_i.

No information

Based on table 2b.2.3 and the example of MarLIN sensitivity rationale a measure of sensitivity of each component to the respective pressure categories should be summarised on a qualitative basis in 2b.2.6.

Table 2b.2.6

		Ecosystem components		
Human pressures				

Step 2c Identify existing management measures

The aim of this step is to identify the implemented and/or proposed management measures, using the information collected in step 1b, where the goals and operational objectives for the SMA were established. The effectiveness of any management is partly dependent on how well the management measures take into account and answer to the desired operational objectives. In successful and efficient management it is of prime importance to match the implemented or proposed management measures as exactly as possible to operational objectives. Management measures range from, for instance, national laws and policies to implement the Habitats Directive, through to codes of conduct that guide the activities of particular users in the SMA. The key focus of the review of existing management measures should be those related to the goal/objective of the SMA, including their links to and influence over other sectoral laws/policies. However, other sectoral laws/policies need not be reviewed in themselves, specifically unless it is to ascertain how they are related to the laws/policies concerning the goal/objective. Further guidance on which existing management measures should be reviewed in relation to the case study goal/objective is being developed through WP6 research and is available in the form of the document 'Guidelines for MESMA WP6 Governance Research'.

The outcome of this step will be a list of the existing or proposed management measures related to the operational objectives in step 1b. This list feeds directly into step 7 where the necessity for adaptation of the current management will be considered. Step 2c can draw on section 2 of the Governance Analytical Structure, which discusses existing management measures in relation to the priority objectives on which the governance analysis is focused.

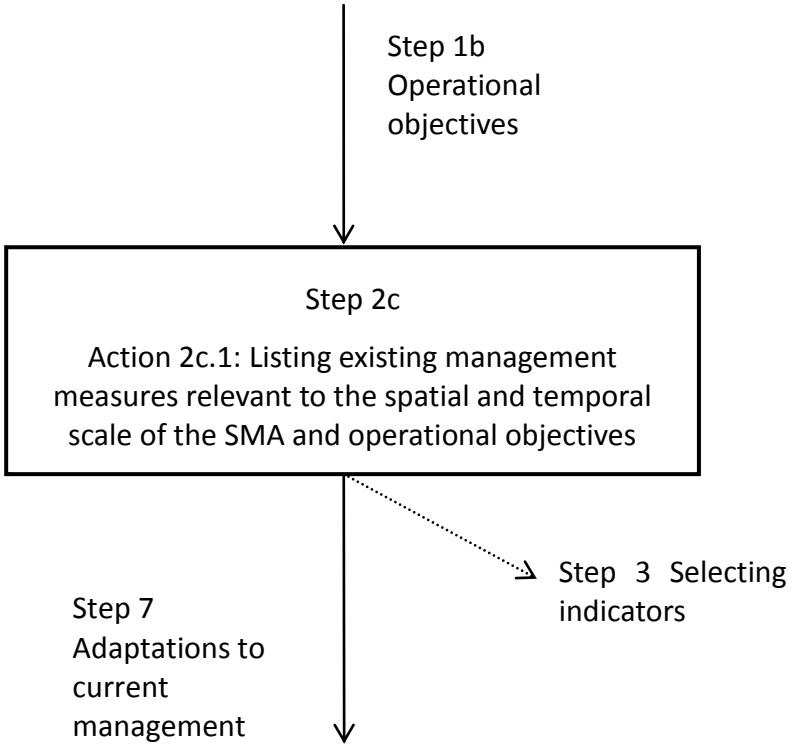


Figure 2c. Work flow for step 2c. See section 2 of the governance framework.

Action 2c.1 Using data collected in step 1b list the existing management measures relevant to the spatial and temporal scale of the SMA and the operational objectives

Generally, management measures can be grouped according to:

- Economic measures
- Interpretative measures
- Knowledge measures
- Legal measures
- Participative measures

Management measures are discussed in the governance analysis undertaken by WP6 – it will be helpful to refer to section 5 of the Governance Analytical Structure to complete this action. Please note that the WP6 analysis focuses only on one priority objective and so additional information may need to be gathered under this action to provide a comprehensive list.

Section 5 of the GA is not available for the Strait of Sicily up to date.

Regarding conservation, the most relevant management initiatives is the set of seven protocols regarding the UNEP RAC SPAs.

Regarding fisheries, the most relevant management initiative toward a sustainable exploitation of the natural resources is the FAO code of conduct for responsible fisheries.

At local scale, local management authorities have been established in Sicily on March 2012. Such authorities have competences on both fisheries and nature conservation, encompass the territory of several municipalities and the sea beyond the coastline up to 12 nm. However, in practice these authorities only deal with several fisheries segments.

The most recent management initiative, and the only one somehow oriented to a unified management action in Sicily, is the creation of the Coastal Action Groups (CAGs). These are charged with putting into effect the Local Development Plans (LDPs), which should be the best expression of integrated management towards sustainability through a real bottom-up approach.

Step 3 Selecting indicators and thresholds

The previous steps produced the spatial boundaries (step 1a) for the assessment and defined a suite of ecological and socio-economic operational objectives (step 1b). The selected objectives have been related to the relevant ecosystem components (step 2a), with an examination of the spatial overlap between those components. The spatio-temporal distribution pattern of human pressures has also been assessed (step 2b).

The aim of this step is to guide the assessor through a standardised process of how to select indicators and respective thresholds in relation to the operational objectives specified in step 1b and the relevant ecosystem components identified in step 2b. The guidance consists of how to assess the appropriateness of the indicators (viability analysis) and how to report on both the rationale for selecting thresholds or using trends and gaps in data availability. The output of this step is a list of indicators suitable for assessing an existing marine spatial management plan or an envisioned spatial management scenario. The actual assessment of the state of the indicators or the potential risks in relation to a suggested management scenario in relation to human pressures will be conducted in step 4 (Figure 3.1).

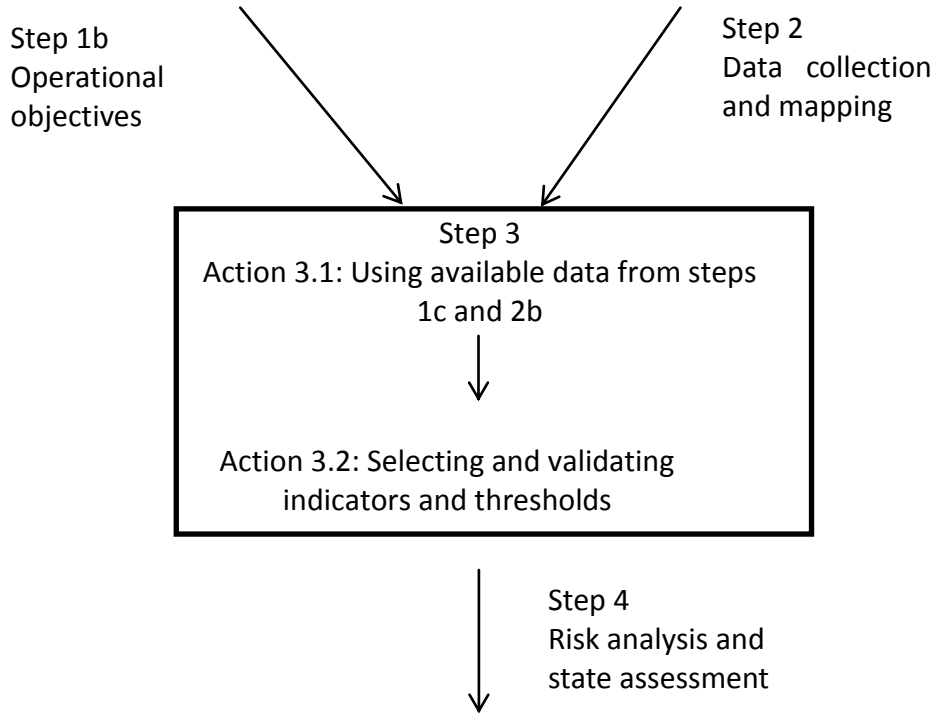


Figure 3.1. Work flow for step 3.

Action 3.1 Using available data from steps 1b and 2b

For each operational objective defined in step 1b, identify the relevant ecological, socio-economic and other components (step 2a) and compile information on the availability of relevant data. Using this information fill out table 3.1 for each operational objective.

Table 3.1

Plan objectives	Are the objectives ecological (E) socio-economic (SE) mixed or other (O)?	Quality of available data (GIS based/Expert knowledge/Qualitative information)	Description /Source /Accessibility	Potential conflicts
Enhancement of the conservation status of the environment and its resources through the reduction of the fisl	E	GIS based	www / good accessibility	
Reduction of the socio-economic impact of the reduction of fishing effort	SE	Quantitative information	www / good accessibility	
Increase of the economic competitiveness	SE	Quantitative information	www / good accessibility	
Reduction of fishing effort in terms of activity and capacity to allow for rebuilding of fish stocks	E	Quantitative information	www / good accessibility	
Recovery of competitiveness of fisheries, aquaculture and transformation of fish products, as well as enhance	SE	Quantitative and qualitative information	www / good accessibility	
Overcome of the sector social and economical exclusion, re-organization of the sector, modernization of struc	SE	Quantitative and qualitative information	www / good accessibility	
Sustain fishery-based areas towards their sustainable development	SE	Quantitative and qualitative information	www / good accessibility	
Defence of long-termed job positions, maintenance of the workers' welfare also through supplementary work	SE	Quantitative and qualitative information	www / good accessibility	
Ecosystem restoration through protection of the fauna and flora, development of research activities and profes	E	Expert knowledge	www / good accessibility	
Reinforcement of controls on production structures, fishing and commercialization activities	SE	Quantitative and qualitative information	www / good accessibility	
Strengthening and enhancement of national and regional management	O	Expert knowledge	www / good accessibility	
Preservation of the stocks capacity of recovering from fishing	E	Quantitative information	www / good accessibility	
Enhancement of the workers' welfare	SE	Quantitative and qualitative information	www / good accessibility	
Increase of job opportunities in fishery-depending areas	SE	Quantitative and qualitative information	www / good accessibility	
Preservation of the stocks capacity of recovering from fishing	E	Quantitative information	www / good accessibility	
Enhancement of the workers' welfare	SE	Quantitative and qualitative information	www / good accessibility	
Increase of job opportunities in fishery-depending areas	SE	Quantitative and qualitative information	www / good accessibility	
Preservation of the stocks capacity of recovering from fishing	E	Quantitative information	www / good accessibility	
Enhancement of the workers' welfare	SE	Quantitative and qualitative information	www / good accessibility	
Increase of job opportunities in fishery-depending areas	SE	Quantitative and qualitative information	www / good accessibility	
Exploitation of biological resources within sustainable limits	E	Quantitative information	www / good accessibility	
Fisheries economic sustainability	SE	Expert knowledge	www / good accessibility	
Maintenance of job positions and adequate entry levels	SE	Quantitative and qualitative information	www / good accessibility	
Preservation of the stocks capacity of recovering from fishing	E	Quantitative and qualitative information	www / good accessibility	
Enhancement of the workers' welfare	SE	Quantitative and qualitative information	www / good accessibility	
Increase of job opportunities in fishery-depending areas	SE	Quantitative and qualitative information	www / good accessibility	
Adoption of efficient energetic systems for use in production, services and residences	O	Expert knowledge	www / very good accessibility	
Promotion of energy saving policies, particularly in buildings	O	Qualitative information	www / very good accessibility	
Promotion of diversification, decentration and decarbonization of electricity sources	O	Expert knowledge	www / very good accessibility	
Promotion of renewable energies and related technologies	O	Expert knowledge	www / very good accessibility	
Facilitation of the creation and growth of energy industries	SE	Expert knowledge	www / very good accessibility	
Liberalization of the energy market and enhanced security in energy supplies	SE	Quantitative and qualitative information	www / very good accessibility	
Introduction of the best available clean technologies for highly demanding industries	O	Expert knowledge	www / very good accessibility	
Promotion of hydrocarbon exploitation in line with law no. 239/2004	SE	Quantitative and qualitative information	www / very good accessibility	(1)
Riformation of conventional power plants to meet the Kyoto protocol and EU regulations	E	Quantitative and qualitative information	www / very good accessibility	
Promotion of large electrical networks	SE	Expert knowledge	www / very good accessibility	
Promotion of the completation of methane networks	SE	Quantitative and qualitative information	www / very good accessibility	
Promotion of the development of hydrogen technologies	SE	Expert knowledge	www / very good accessibility	
Optimization of transport (biofuels, methane, trafic reduction, train and ship transport of goods)	O	Quantitative and qualitative information	www / very good accessibility	
Preservation of the stock turn-over capacity: Enhancement of the CPUEs	O	Quantitative and qualitative information	contact person / practically unaccessible	
Preservation of the stock turn-over capacity: Increase of the commercial length	O	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of fishing effort: Reduction of the fishing days per year	E	Quantitative and qualitative information	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Increase in job opportunities: Job positions in fishing related activities	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Preservation of the stock turn-over capacity: Enhancement of the CPUEs	O	Quantitative and qualitative information	contact person / practically unaccessible	
Preservation of the stock turn-over capacity: Increase of the commercial length	O	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of fishing effort: Reduction of the fishing days per year	E	Quantitative and qualitative information	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Increase in job opportunities: Job positions in fishing related activities	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Preservation of the stock turn-over capacity: Optimization of the CPUEs	O	Quantitative and qualitative information	contact person / practically unaccessible	
Preservation of the stock turn-over capacity: Increase of the commercial length	O	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of fishing effort: Reduction of the fishing days per year	E	Quantitative and qualitative information	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Increase in job opportunities: Job positions in fishing related activities	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of the fishing effor	E	GIS based	contact person / practically unaccessible	
Reduction of exploitation level, fishing effort, bycatch and environmental impact: Optimization of the CPUEs	O	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of bycatch	E	Quantitative and qualitative information	contact person / practically unaccessible	
Reduction of exploitation level, fishing effort, bycatch and environmental impact: Reduction of environmental i	E	Expert knowledge	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Enhancement of the revenue over the inflaction of fishin	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Promotion of undervaluated products	SE	Qualitative information	contact person / practically unaccessible	
Enhancement of the economy of the fishery workers: Reduction of the cost of fishing and associated activities	SE	Quantitative and qualitative information	contact person / practically unaccessible	
Increase in job opportunities: Job positions in fishing related activities	SE	Qualitative information	contact person / practically unaccessible	
Sustain Malta's Marine Fisheries Resources and the habitats and ecosystems upon which they depend	E	Expert knowledge	www / good accessibility	
Maintain a viable fishing industry as part of Malta's economic strategy	SE	Quantitative and qualitative information	www / good accessibility	
Improve public understanding of and involvement in fisheries management	SE	Qualitative information	www / good accessibility	
Adjustment of fishing effort to sustainability	O	Expert knowledge	www / good accessibility	
Development of processing and marketing sectors	SE	Quantitative and qualitative information	www / good accessibility	
Enhancement of the infrastructure servicing fisheries and aquaculture	SE	Qualitative information	www / good accessibility	
Improvement of the quality of life in coastal areas by the diversification of employment propects	SE	Qualitative information	www / good accessibility	
Improvement of competitiveness of the fishery sector	SE	Quantitative and qualitative information	www / good accessibility	
Adjustment of fishing effort to sustainability	O	Expert knowledge	www / good accessibility	
Modernization of the fishing fleet	SE	Quantitative and qualitative information	www / good accessibility	
Increased trained fishers	SE	Quantitative and qualitative information	www / good accessibility	
To reduce negative impact on the environment	SE	Quantitative and qualitative information	www / good accessibility	
To enhance the processing and packaging facilities of the aquaculture and fisheries industries	SE	Qualitative information	www / good accessibility	
To enhance the promotion and marketing of species and products of interest to the market	SE	Qualitative information	www / good accessibility	
Upgrading of fisheries infrastructure at designated ports	SE	Quantitative and qualitative information	www / good accessibility	
Relocation of fish markets	SE	Quantitative and qualitative information	www / good accessibility	
Facilitating marketing and promotional campaigns	SE	Qualitative information	www / good accessibility	

(1) With nature conservation policies, as well as renewables, decarbonization and Kyoto protocol within the same policy

Action 3.2 Selecting and validating indicators

The indicators will be chosen to enable tracking of the operational objectives set for the specific SMA, to see if they are met.

An extensive knowledgebase on indicators exists already and has been partly collated within WP1 of MESMA. Examples of indicators can be taken from a number of sources. In the European Seas a global objective is Good Environmental Status (GES), as described in the Marine Strategy Framework Directive (2008/56/EC) and the Commission Decision 2010/477/EU. The MSFD (Annex I) proposes 11 descriptors of the GES (i.e. Biological diversity, Alien species, Commercial Fish, Food webs, Eutrophication, Sea floor integrity, Hydrography, Contaminants, Contaminants in food, Marine litter and Energy, including noise) that cover the most common components relevant for many of the different operational objectives. Several task groups developed a suit of 83 indicators (see D2.1) for those descriptors (2010/477/EU). Some of those indicators are already elaborated for the needs of the WFD (2000/60/EC) and were published and tested in the inter-calibration process. Others are in preparation and the complete set of indicators for the 11 descriptors will be ready by 2015.

Another source of indicators is the 'Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management' (2006, UNESCO). Practical experience from the implementation of integrated coastal zone management (ICZM) produced an array of literature on relevant indicator selection (see e.g. Diedrich et al. 2010 and references therein). Like the implementations of ICZM, there are a number of studies that aim to evaluate the effectiveness of marine protected areas (MPAs) using indicators. For further details on these and for the references used in this section please consult D2.1.

Indicators (state and pressure indicators) should be viable from both a scientific and a management perspective. For each of the selected candidate indicators, conduct a viability analysis by scoring the indicators as very good (5); good (4); intermediate (3); poor (2); very poor (1) or unsuitable (0), using the set of criteria listed in table 3.2.1 (modified after ICES criteria for good indicators). The table summarises the scoring results for all candidate indicators and indicates if the respective indicator has been selected for subsequent analysis. From the final set of indicators, identify which are most important for evaluation of ecological status, pressures, impacts, and management measures in the SMA; this enables prioritisation if resources are limited.

Table 3.2 Indicators present in the different (sectoral) fisheries management plans in place in the Italian territory of the Strait of Sicily

Criteria for viability analyses: [1] Instantaneous rate of total mortality (Z)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	1
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	1
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	1
Sum	15

Criteria for viability analyses: [2] Instantaneous rate of mortality by fishing (F).	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	3
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	26

Criteria for viability analyses: [3] Exploitation rate (E)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	3
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	25

Criteria for viability analyses: [4] Mean exploited spawning stock biomass / mean unexploited spawning stock biomass (ESSB/USSB)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	3
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	24

Criteria for viability analyses: [5] Mean Catch Per Unit Effort (CPUE) (Kg)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	3
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	30

Criteria for viability analyses: [6] Total abundance [in the field]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	19

Criteria for viability analyses: [7] Total abundance of spawners [in the field]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	19

Criteria for viability analyses: [8] Total abundance of recruits [in the field]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	1
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	18

Criteria for viability analyses: [9] Total biomass [in the field]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	20

Criteria for viability analyses: [10] Maximum sustainable yield (MSY)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	1
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	23

Criteria for viability analyses: [11] Total construction of fishing vessels (KW)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	28

Criteria for viability analyses: [12] Total construction of fishing vessels (GT)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	28

Criteria for viability analyses: [13] Total upgrading of fishing vessels (KW)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	26

Criteria for viability analyses: [13] Total upgrading of fishing vessels (GT)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	26

Criteria for viability analyses: [15] Total catch (Tm)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	3
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	30

Criteria for viability analyses: [16] Mean catch by vessel (Tm)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	25

Criteria for viability analyses: [17] Mean catch by day (Kg)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	25

Criteria for viability analyses: [18] Mean gross profit by vessel (eur)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [19] Mean gross profit by worker	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [20] Mean gross profit by revenue	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [21] Mean gross profit by invested capital	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [22] Mean net profit by invested capital	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	22

Criteria for viability analyses: [23] Mean net profit by revenue [mean income]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	22

Criteria for viability analyses: [24] Mean revenue by fishing vessel	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [25] Mean revenue by day (eur)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [26] Mean price of product	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [27] Mean added value by fishing vessel (eur)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	1
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	18

Criteria for viability analyses: [28] Mean added value by worker (eur)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	1
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	18

Criteria for viability analyses: [29] Mean net profit by gross revenue [it seems the same than 23: Mean net profit by revenue (mean income)]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	22

Criteria for viability analyses: [30] Total invested capital (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [31] Total gross profit (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	21

Criteria for viability analyses: [32] Total amortizations (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	1
Sum	19

Criteria for viability analyses: [33] Total interests (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	1
Sum	19

Criteria for viability analyses: [34] Total net profit (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	22

Criteria for viability analyses: [35] Total number of fishermen	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	22

Criteria for viability analyses: [36] Total number of job positions	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	20

Criteria for viability analyses: [37] Mean cost by worker	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	20

Criteria for viability analyses: [38] Total production of fishing products (Tm x 10^3)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	27

Criteria for viability analyses: [39] Total import of fishing products (Tm x 10^3)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	1
Sensitivity to change (change over time)	1
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	23

Criteria for viability analyses: [40] Reduction of production cost (eur / vessel)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	24

Criteria for viability analyses: [41] Increase of productivity (Tm / vessel)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	3
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	26

Criteria for viability analyses: [42] Increase of profit (eur / vessel) [largely dependent on 40 and 41]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	2
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	24

Criteria for viability analyses: [43] Ratio of consumption of local products in the domestic market (total product / apparent consumption)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	1
Measurable over a large proportion of the area to which the indicator metric is to apply	1
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	2
Sum	19

Criteria for viability analyses: [44] Value of total production (eur x 10^6)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	3
Sensitivity to change (change over time)	3
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	25

Criteria for viability analyses: [45] Number of collective actions	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	25

Criteria for viability analyses: [46] Number of local management plans	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	3
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	25

Criteria for viability analyses: [47] Number of facilities	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	1
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	22

Criteria for viability analyses: [48] Number of projects to enhance services to fishermen in ports	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	23

Criteria for viability analyses: [49] Number of fishing vessels regarded [by those projects?]	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	23

Criteria for viability analyses: [50] Number of projects to develop markets	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	1
Sensitivity to change (change over time)	1
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	20

Criteria for viability analyses: [51] [Number of] pilot projects (ARs, restocking)	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	1
Sensitivity to change (change over time)	1
Relatively tightly linked in time to that activity	1
Easily and accurately measured with a low error rate	3
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	3
Based on an existing body of time-series of data to allow a realistic setting of objectives	1
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	2
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	20

Criteria for viability analyses: [52] Number of production operators	Score (good=3; medium=2; poor=1)
Relatively easy to understand by non-scientists and those who will decide on their use	3
Sensitive to manageable human activity	2
Sensitivity to change (change over time)	2
Relatively tightly linked in time to that activity	2
Easily and accurately measured with a low error rate	2
Responsive primarily to a human activity, with low responsiveness to other causes of change	2
Measurable over a large proportion of the area to which the indicator metric is to apply	2
Based on an existing body of time-series of data to allow a realistic setting of objectives	2
State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	3
Complexity of managing the indicator (high level of coordination or expensive technological requirements)	3
Sum	23

Insert the results of the individual indicator assessment in the following table and indicate if the respective indicator is selected for the subsequent analysis. From the final set of indicators, identify which are most important to evaluate the ecological status, pressures and impacts, and management measures in the SMA in question, in order to prioritise if resources are limited.

Table 3.3

Candidate indicator	Total Score	Selected (Y/N)
[1] Instantaneous rate of total mortality (Z)	15	N
[2] Instantaneous rate of mortality by fishing (F)	26	Y
[3] Exploitation rate (E)	25	N
[4] Mean exploited spawning stock biomass / mean unexploited spawning stock biomass (ESSB/USSB)	24	Y
[5] Mean Catch Per Unit Effort (CPUE) (Kg)	30	N
[6] Total abundance	19	N
[7] Total abundance of spawners	19	N
[8] Total abundance of recruits	18	N
[9] Total biomass	20	N
[10] Maximum sustainable yield (MSY)	23	N
[11] Total construction of fishing vessels (KW)	28	Y
[12] Total construction of fishing vessels (GT)	28	Y
[13] Total upgrading of fishing vessels (KW)	26	N
[14] Total upgrading of fishing vessels (GT)	26	N
[15] Total catch (Tm)	30	N
[16] Mean catch by vessel (Tm)	25	N
[17] Mean catch by day (Kg)	25	N
[18] Mean gross profit by vessel (eur)	21	Y
[19] Mean gross profit by worker (eur)	21	N
[20] Mean gross profit by revenue	21	N
[21] Mean gross profit by invested capital	21	N
[22] Mean net profit by invested capital	22	N
[23] Mean net profit by revenue	22	N
[24] Mean revenue by fishing vessel	21	N
[25] Mean revenue by day (eur)	21	N
[26] Mean price of product	21	N
[27] Mean added value by fishing vessel (eur)	18	N
[28] Mean added value by worker (eur)	18	N
[29] Mean net profit by gross revenue	22	N
[30] Total invested capital (eur x 10^6)	21	N
[31] Total gross profit (eur x 10^6)	21	N
[32] Total amortizations (eur x 10^6)	19	N
[33] Total interests (eur x 10^6)	19	N
[34] Total net profit (eur x 10^6)	22	N

[35] Total number of fishermen	22	Y
[36] Total number of job positions	20	N
[37] Mean cost by worker	20	N
[38] Total production of fishing products (Tm x 10^3)	27	N
[39] Total import of fishing products (Tm x 10^3)	23	N
[40] Reduction of production cost (eur / vessel)	24	N
[41] Increase of productivity (Tm / vessel)	26	N
[42] Increase of profit (eur / vessel)	24	N
[43] Ratio of consumption of local products in the domestic market (total product / apparent consumption)	19	N
[44] Value of total production (eur x 10^6)	25	N
[45] Number of collective actions	25	N
[46] Number of local management plans	25	N
[47] Number of facilities	22	N
[48] Number of projects to enhance services to fishermen in ports	23	N
[49] Number of fishing vessels regarded [by those projects?]	23	N
[50] Number of projects to develop markets	20	N
[51] [Number of] pilot projects (ARs, restocking)	20	N
[52] Number of production operators	23	N

Table 3.2.1

Operational objective	Indicator	Criteria for viability analyses*											Total score	Selected (Y/N)
		Relatively easy to understand by non-scientists and those who will decide on their use	Sensitive to manageable human activity	Sensitivity to change (change over time)	Relatively tightly linked in time to that activity	Easily and accurately measured with a low error rate	Responsive primarily to a human activity, with low responsiveness to other causes of change	Measurable over a large proportion of the area to which the indicator metric is to apply	Based on an existing body of time-series of data to allow a realistic setting of objectives	State of the development of the methodology to calculate the indicator (all formulas and measurements defined (3); more work needed (2); none (1))	Complexity of managing the indicator (high level of coordination or expensive technological requirements)	Remarks /Uncertainty assessment		
Objective 1	Indicator 1													
Objective 1	Indicator 2													
Objective N	Indicator N													
		Scores for viability analyses: very good= 5; good = 4; intermediate= 3; poor=2; very poor=1; unsuitable = 0												

After selecting the most appropriate indicators for each goal/operational objective, fill in the following table 3.2.2 to identify gaps in the available data.

In table 3.2.2, availability means true access to the required data (restrictions in data sharing may obstruct access to existing data; such data should be indicated as unavailable and a comment should be provided in the 'Remarks' column explaining the reasons for non-accessibility).

Table 3.2.2

Goal/Operational Objective	Indicator	Needed data	Availability (YES/NO)	Remarks
D1: Reduction of fishing mortality	2: Mortality by fishing	Catch records	Yes	Lack of long term records
D1: Reduction of fishing mortality	4: ESSB/USSB	Catch records	Yes	Lack of long term records
D2: Enhancement of welfare	18: Mean gross profit by vessel	Market records	Yes	Gross profit does not exactly correspond to welfare
D3: Nature conservation	None	Location and status of natural resources	Very limited	Paucity of information
D4: Sustainable exploitation	11: Total fishing capacity (KW)	Catch records	Yes	Low uncertainty (error 3.5%)
D4: Sustainable exploitation	12: Total fishing capacity (GT)	Catch records	Yes	Low uncertainty (error 3.5%)
D5: Cultural heritage	35: Number of fishermen	Identification and status of cultural values	No	Lack of information

Another important step is the definition of thresholds against which the status of the indicators can be assessed. Any thresholds or reference points should ideally reflect high level goals. Thus a respective reference point indicates a level of sustainable use or development. Whilst for some established indicators, respective thresholds may be defined, for others, thresholds have yet to be defined. List the indicators and the availability of thresholds in table 3.2.3.

Table 3.2.3

Indicator	Threshold already established (YES/NO)	If YES, explain how the threshold was derived (e.g. using the sustainability or precautionary principle)	Trend (e.g. rate, direction or sign of change)	If a trend is used instead, elaborate on a good and bad trend
2: Mortality by fishing	Y	Sustainability (Aladym model)	Negative	Good trend but socially costly
4: ESSB/USSB	Y	Sustainability (Aladym model)	Negative	Good trend but socially costly
11: Total fishing capacity (KW)	Y	Sustainability (Aladym model)	Negative	Good trend but socially costly
12: Total fishing capacity (GT)	Y	Sustainability (Aladym model)	Negative	Good trend but socially costly
18: Mean gross profit by vessel	Y	NA	Negative	Good trend but socially costly
35: Total number of fishermen	Y	NA	Negative	Good trend but socially costly

For the indicators listed in table 3.2.3 where no threshold is established and no trend will be used, describe how the threshold will be derived to conduct step 4, using either: 1) historical data, 2) model estimates, 3) reference areas (high pressure vs. low pressure) or 4) expert knowledge. Subsequently, the rational and derived thresholds should be outlined.

Using the above tables, identify where there are gaps in the data and produce a (textual or tabular) summary of any gaps that are preventing estimation of the selected indicators. Suggest how it might be possible to solve this problem by obtaining access to unavailable data, for example through monitoring programs to collect additional data.

There are three main gaps to attain the overarching goal of sustainability.

One gap is the inadequacy of the objectives to the inspiring principles of the policies. Indicators and thresholds are defined for the management of the resource instead of the exploitation. As a result, there are not objectives neither indicators related to a zoning scheme in the space, although such a thing is stated as high level goal of both the policy and the plan. This fact represents a huge gap in the management of fisheries.

The other gap is the paucity of proper data, which provokes the inaccuracy of parameter estimates used to fit models and to help in decision-making. In addition, most data refer to few years and long-termed data series are generally lacking. To solve this difficulties, more monitoring data should be recorded through well harmonized sampling programs.

There are well established overarching goals that are hardly operationalised, and others for which no indicators, neither thresholds, exist. These are the cases of those relative to D3 (nature conservation), and D5 (preservation of the cultural heritage), respectively. Local decision-makers prove to be unable to cope with the concepts underpinning the goals of EU policies and their work is too often limited to formal plans

of little efficiency. To solve these difficulties more guidance should be provided to decision-makers, through open, transparent and participative mechanisms.

Step 4 Risk analysis and state assessment

After the performance indicators have been selected and their thresholds (or trends) determined (step 3), step 4 now looks into the technical characterisation of risk (step 4a) and/or state (step 4b). It is important to differentiate between the two (risk and state); both depend on the level of development of the spatial management plan. If a spatial management plan is not in place, step 4 should calculate the likelihood of meeting the operational objectives, as summarized by the indicators and their targeted thresholds or trends (i.e. risk analysis, step 4a). If a spatial management plan is in place, step 4 should (also) calculate whether or not the operational objectives were met, relative to the indicators and their targeted thresholds or trends (i.e. state assessment, step 4b). The output of step 4, the characterization of the risk or the actual state, will feed into the evaluation of meeting the operational objectives (step 5), where the interpretation of the risk analysis and or state assessment will be carried out.

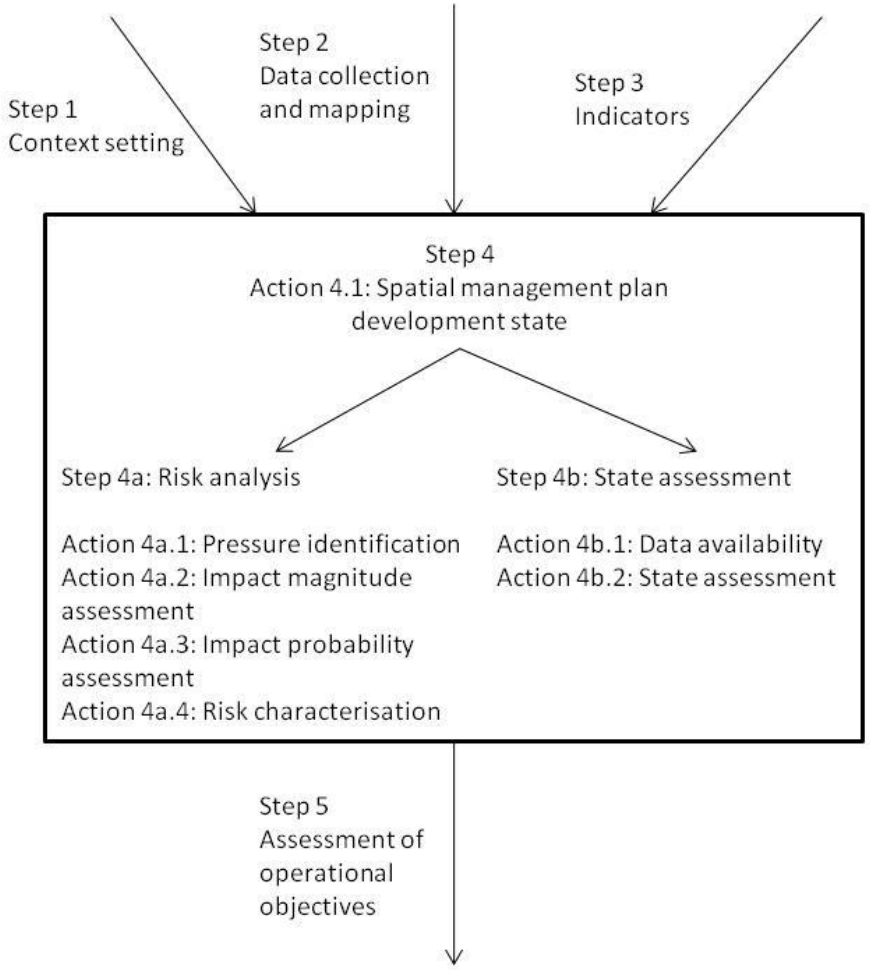


Figure 4.1. Work flow of step 4.

Action 4.1 Spatial management plan developmental state

Depending on the stage of development of the spatial management plan or initiative considered, step 4 will pass through a risk analysis (step 4a) or a state assessment (step 4b).

Before management measures to achieve the operational objectives are implemented, several alternative spatial management scenarios, each with specific management measures, should be developed and

assessed. The likelihood of each scenario achieving its operational objectives (Step 1b), (as summarized by the set of indicators and associated thresholds or trends developed in Step 3), should then be assessed and compared through a risk analysis. The actions that should be taken in order to run this risk analysis are included in step 4a. This step presents a basic, spatially explicit risk assessment framework, comprising an assessment of the level of impact of a pressure on the ecosystem components described by the respective indicator together with an estimation of the likelihood of a spatial overlap of the ecosystem component with the occurrence (in space and time) of the relevant human pressures.

When management measures to achieve the operational objectives are already implemented, the actual state, obtained through the implementation of the management plan, should be evaluated against the operational objectives (Step 1b), summarized by the suite of indicators and their thresholds or trends (Step 3). The steps to be taken to run this state assessment are included in step 4b.

It will be necessary to evaluate the spatial management plan developmental state, based on the results of Step 1. Consult the following bullet points for direction to the appropriate step:

- Spatial management plan not available - go to step 4a.
- Spatial management plan available but not implemented - go to step 4a.
- Spatial management plan implemented - go to step 4b.

Step 4a: Risk analysis

Action 4a.1 Pressure identification

For each of the selected indicators (step 3), summarise (in table 4a.1) the human pressures that have a direct or indirect effect on those indicators (collected in step 2b).

Table 4a.1

Indicator	Threshold / Trend	Pressure
Example: Species abundance (N/area)	*15% above 5 year average*	*Selective extraction*
		Eutrophication
		Abrasion

Action 4a.2 Impact assessment

Using available literature, assess the magnitude of the impact these pressures will have on the indicator. Is the impact direct or indirect, caused by the pressure, assessed as being high, medium or low? Complete table 4a.2 to capture this and carry out a (qualitative) assessment of the degree of uncertainty (based on data quality) in the assessment (e.g. using a high, medium and low reporting scale).

Since this action may require input from different assessors with a range of expertise, keep a record of the individuals involved in the assessment by entering their names into the last column of table 4a.2.

Example: *The likelihood of mortality of a harbour porpoise once entangled in a gill net, is considered high.*

Table 4a.2

Indicator	Pressure	Magnitude of Impact (high, medium or low)	Measure of uncertainty (high, medium or low)	Name of Assessor
Example 1: Harbour porpoise by-catch mortality	*(Non-selective) extraction of non-target species*	*High*	*Medium*	*John Smith*
Example 2: Number of long-lived species	*Abrasion*	*Medium*	*Medium*	*John Smith*

Action 4a.3 Impact likelihood assessment

Using GIS tools and the maps produced in steps 2a and 2b, identify where there may be overlap between the indicators and pressures. Produce GIS maps, indicating where these overlaps may occur, to assess the likelihood of occurrence of an impact. Qualify this likelihood as high, medium or low.

Example: *The likelihood of actual extraction of a harbour porpoise through e.g. gill netting is considered low.*

Table 4a.3

Indicator	Pressure	Impact likelihood (high/medium/low)	Measure of uncertainty (high/medium/low)
Example 1: Harbour porpoise by-catch mortality	*(Non-selective) extraction of non-target species*	*Low*	*Low*
Example 2: Number of long-lived species	*Positive trend*	*High*	*High*

Action 4a.4 Risk characterization

The information in tables 4a.2 and 4a.3 should be used to fill out the scoring matrix given in table 4a.4.1, to assess the overall relative risk where:

< 3 = Low relative risk
3-4 = Medium relative risk
> 4 = High relative risk

For example: *The likelihood that a harbour porpoise is killed by extraction (e.g. gill netting) in the Belgian part of the North Sea is considered medium.*

Table 4a.4.1

		Likelihood of impact		
		Low (1)	Medium (2)	High (3)
Magnitude of impact	High (3)	3	6	9
	Medium (2)	2	4	6
	Low (1)	1	2	3
Relative risk: Low:1-2, Medium: 3-4, High: 6,9				

Complete table 4a.4.2 below to characterise the relative risk and provide an overall description of uncertainty. (The risk analysis results will be summarised in step 5.)

Table 4a.4.2

Indicator	Pressure	Relative risk (low, medium or high)	Uncertainty (low, medium or high)
Example 1: Harbour porpoise by-catch mortality	*(Non-selective) extraction non-target species*	*Medium*	*Medium*
Example 2: Number of long-lived species	*Positive trend*	*High*	*High*

Finally, provide some concluding remarks on the likelihood that each management option will fail to meet the stated operational objectives.

Step 4b State assessment

Action 4b.1 Data availability assessment

This action evaluates the data availability (taken from step 2) for a proper evaluation of the status of the indicators, relative to their respective thresholds or trends (taken from step 3). This action should be performed on an indicator-by-indicator basis. If good data are available for a given indicator, the indicator's status can be evaluated in action 4b.2. If poor data are available for a given indicator, then the state assessment halts here until the appropriate data can be collected. In this case, the risk analysis outlined in step 4a has to be undertaken as an intermediate solution.

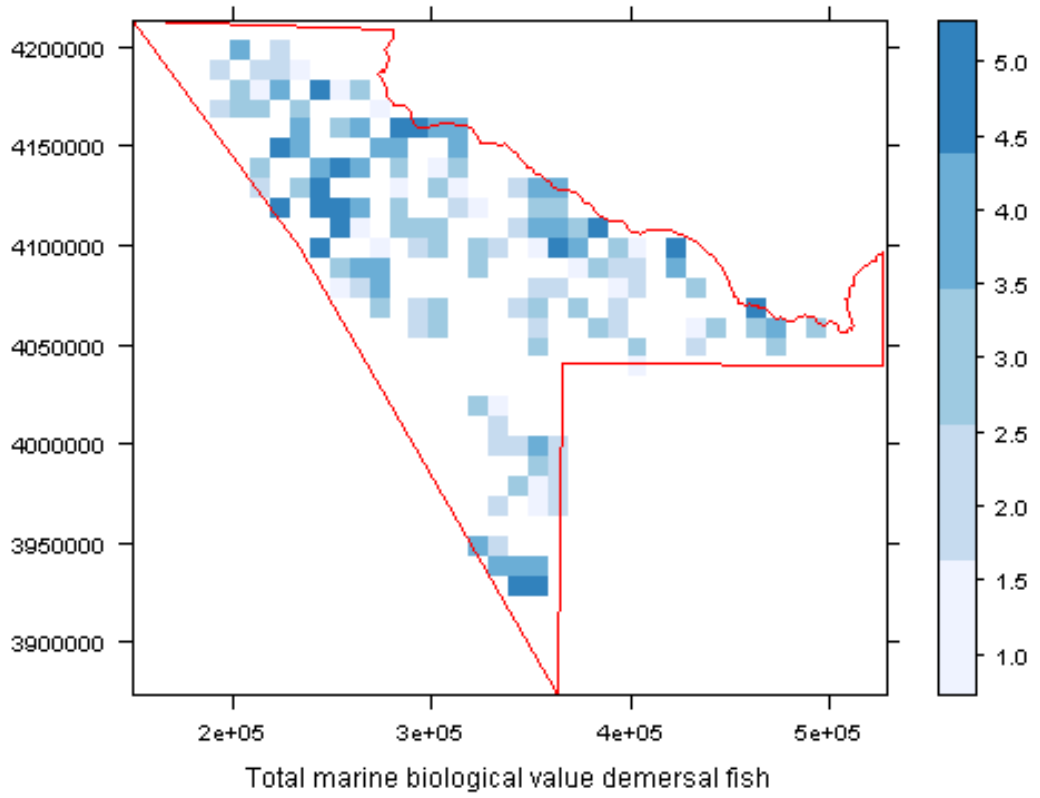
To proceed, answer the question: does the available data (from step 2) allow for the assessment of the status of the indicators, selected in step 3? Qualify data available as sufficient or insufficient. Where data are unsuitable (or 'insufficient'), return to step 4a to conduct a risk analysis before progressing through the rest of the framework – it should be possible to return to complete step 4b at a later date when sufficient data have been collected. Where data are fit for purpose (or 'sufficient'), progress to step 4b.2.

Tables 4b.1 and 4b.2 were modified to fit them to the nature and characteristics of the indicators that appear in the several management plans (divided by GSAs) in the Strait of Sicily.

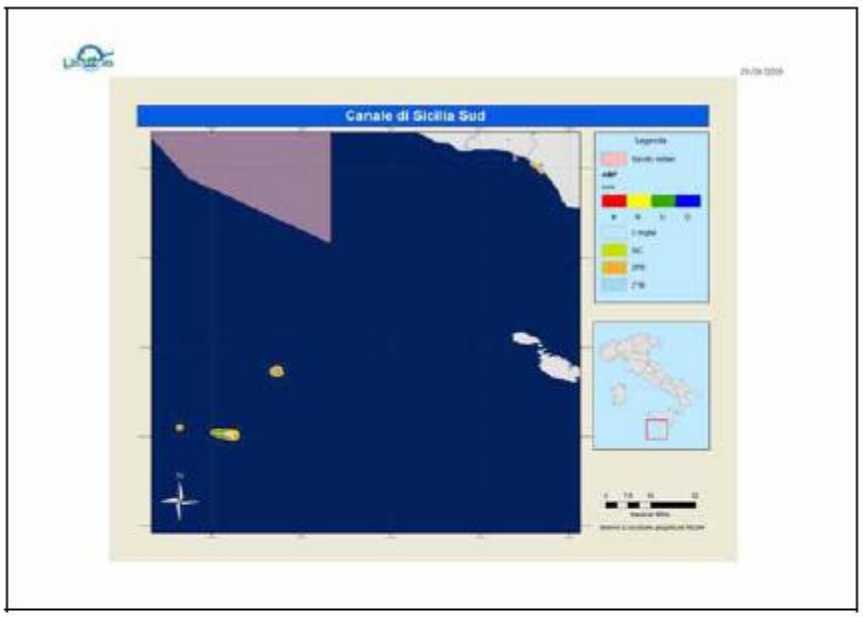
ID no.	Indicator	Data sufficiency	Indicator status (2010)	Indicator threshold (2015)	Expected trend (5 years)	Uncertainty level	Identified difficulties	Risk of not meeting the target
2	Mortality by fishing (F hake)	Y	0.7 - 1.0	F0.1	-80%	25% error	1, 2	Very high
2	Mortality by fishing (F mullet)	Y	1.2 - 1.4	F0.1	-80%	25% error	1, 2	Very high
2	Mortality by fishing (F shrimp)	Y	1.2 - 1.5	F0.1	-80%	25% error	1, 2	Very high
4	ESSB/USSB (hake)	Y	0.04	0.35	+22.57%	25% error	1, 2, 6	Very high
4	ESSB/USSB (mullet)	Y	0.15	0.35	+31.91%	25% error	1, 2, 6	Very high
4	ESSB/USSB (shrimp)	Y	0.12	0.35	+11%	25% error	1, 2, 6	Very high
11	Total fishing capacity (KW)	Y	76104	62362	-13742	Negligible	1, 3	Medium
12	Total fishing capacity (GT)	Y	25959	20967	-4992	Negligible	1, 3	Medium
18	Mean gross profit by vessel	Y	98000 eur	NA	+130%	3.5% error	4, 5	High
35	Total number of fishermen	Y	1884	NA	-23%	3.5% error	4, 5	High

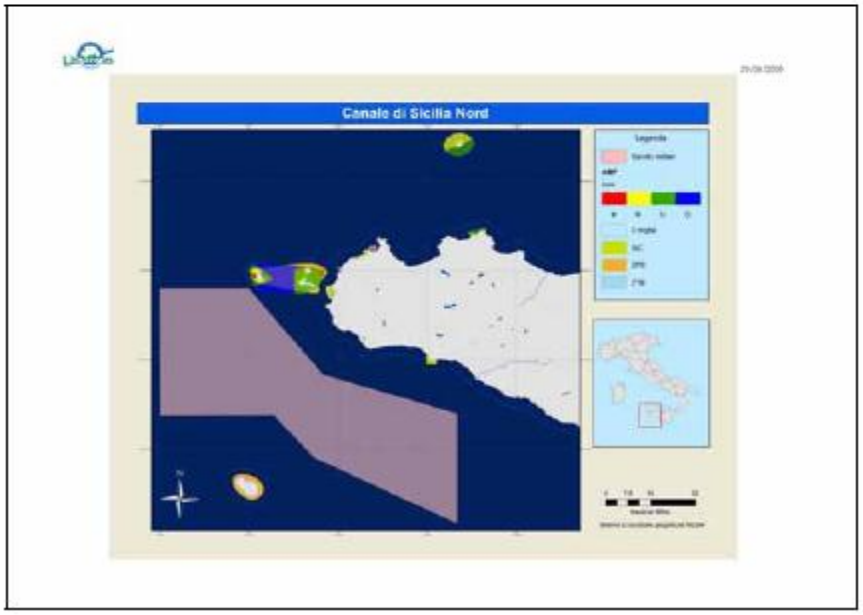
(1) The required reduction in fishing capacity is not allowed by law (a maximum of 19% of the fleet can be dismissed).
(2) Some exclusion areas accounting for most of the total area (nursery, biological protection and easement for military purposes) were not implemented.
(3) Objectives refer to constructed (ID no. 11) or upgraded (ID no. 12) fishing vessels rather than actual fishing capacity.
(4) Substantially dependent of external drivers.
(5) The model used to estimate the trends is not disclosed.
(6) The trend is wrong: it should be positive but appears as negative in the plan

Map of the spatial distribution of demersal biodiversity as BVM

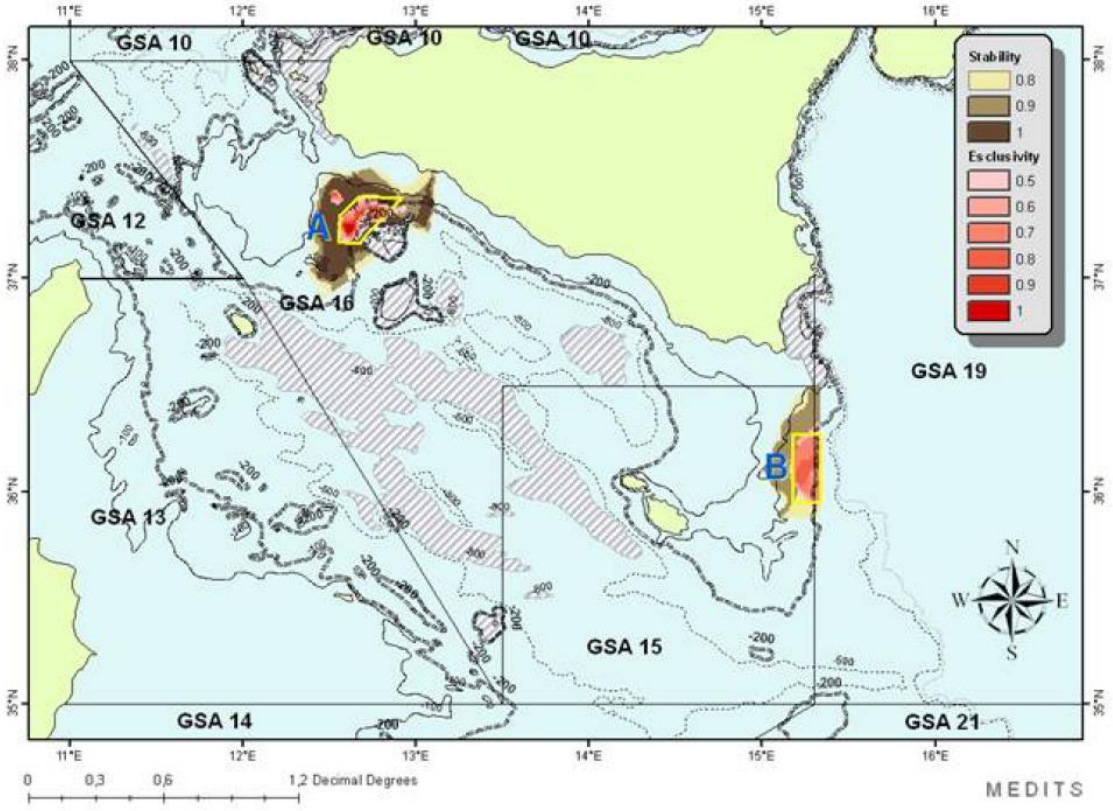


Map of some of the protected areas stated in the off-shore trawl-fishing management plan of the GSA 16 (Italy). These areas are not enforced and trawl fishing is regularly carried across the whole area. See the map of the spatial distribution of fishing pressure in Step 2b.





Map of the two Biological Protection Zones (labeled A and B) for the nursery grounds of the hake, as stated in the off-shore trawl-fishing management plan of the GSA 16 (Italy). These areas are not enforced and trawl fishing is regularly carried out there. See also the map of the spatial distribution of fishing pressure in Step 2b.



Map of the zoning scheme regarding trawl-fishing. Note that fishing effort extends well over areas where such activity is banned. See also the map of the spatial distribution of fishing pressure in Step 2b.

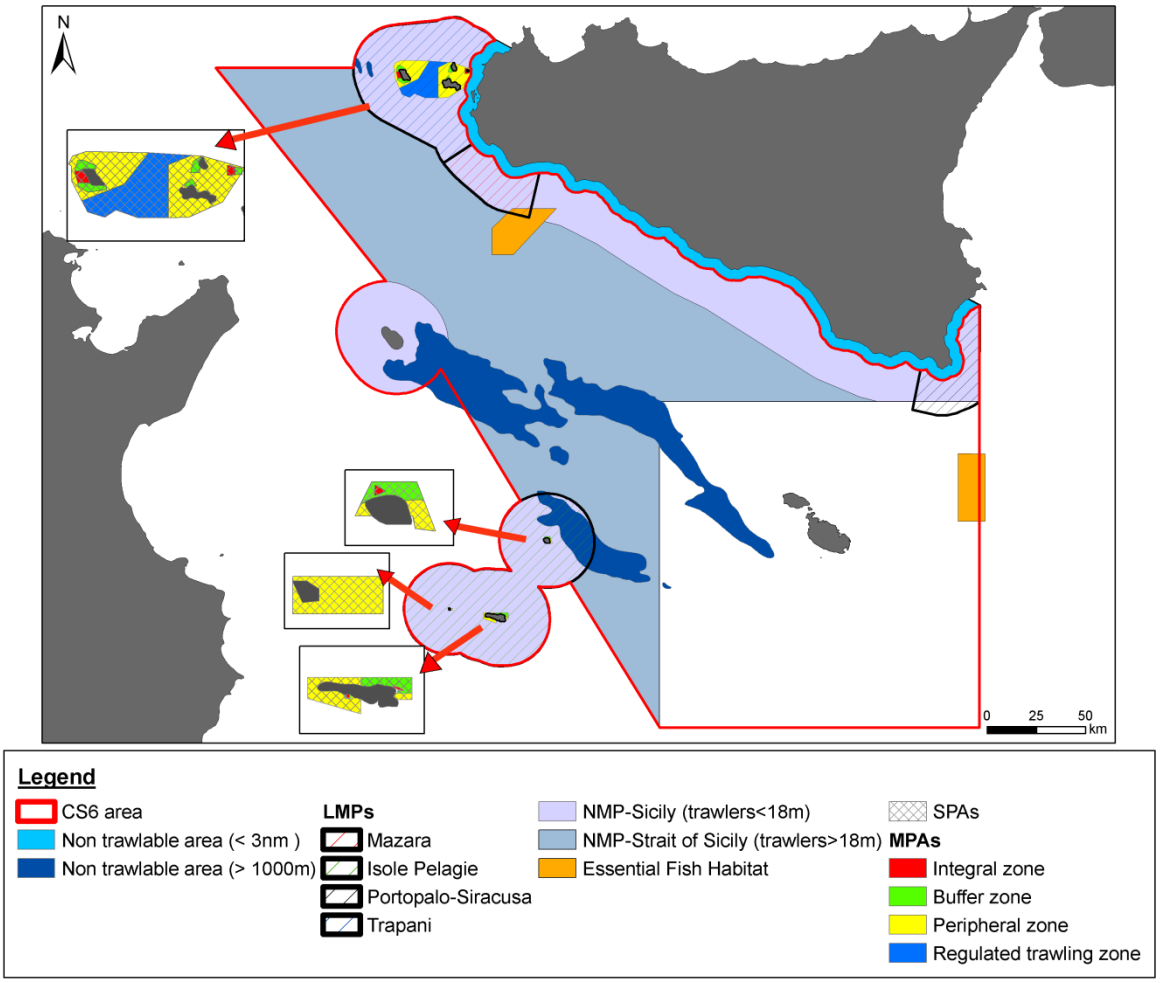


Table 4b.1

Indicator	Data availability - sufficient or insufficient?	Go to Step 4a or 4b.2?
Example 1: harbour porpoise bycatch mortality	*Insufficient*	*Step 4a*
Example 2: Wind energy production	*Sufficient*	*Step 4b.2*
Example 3: Employment in fisheries	*Sufficient*	*Step 4b.2*

Action 4b.2 Indicator state assessment

When good (sufficient) data are available, these data should be used to quantify (or qualify) the status of the selected indicators (this is monitoring, based on existing data) and evaluate this figure relative to the indicator's threshold or trend (which is an indicator-specific target). Qualify as target met or not met.

Table 4b.2

Indicator	Indicator status	Indicator threshold or trend	Evaluation: Target met (+) or not met (-)?
Example 1: Wind energy production	*1200 MWh*	*900 MWh min.*	+
Example 2: Employment in fisheries	*432 persons*	*600 persons min.*	-

Step 5 Assessing findings against operational objectives

The aim of step 5 is to look at the results of the risk analysis and/or state assessment and interpret these results in terms of whether the operational objectives have been achieved or failed and by how much, together with their relative importance in terms of future management adaptations. Several actions are proposed in order to achieve the aims of this step. First, a summary of the state or potential state of the indicators and how these are linked to the operational objectives is completed. Secondly, an overall table listing the operational objectives and indicating if these have been achieved or failed, how successful or unsuccessful they were, how important operational objectives were to each other and how they can be weighted to inform future management (step 7). Finally, there is an opportunity to revisit the evaluation of indicators (step 3) to assess if the indicators used in step 4 were appropriate for analysis.

The outputs from step 5 will be:

- Table 5.2 assessing the operational objectives which will feed into step 6 and step 7.
- A second table (5.3) highlighting whether indicators used for analysis were appropriate. This will also feed into step 7.

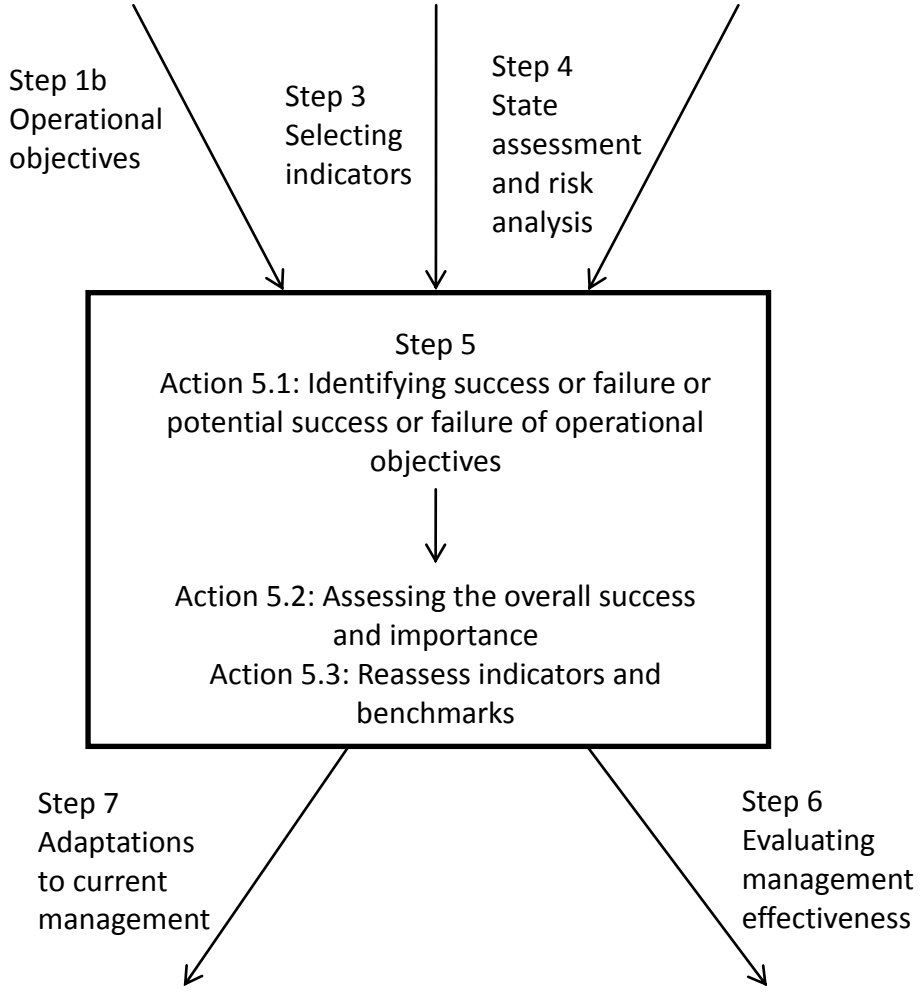


Figure 5.1. Work flow for step 5.

Action 5.1 Identifying success and failure of objectives

This task provides a technical summary of the risk analysis and goes one step further by linking indicators back to their operational objectives. It is divided into two sections depending on the type of analysis that has been carried out in the risk analysis / state assessment of step 4. If a **risk analysis** (see step 4a) has been carried out, then we can only investigate the risk of the objective failing the state assessment. If a **state assessment** (see step 4b) has been carried out, then it is possible to clearly identify whether objectives have been met or not. Where trends were used as benchmarks (see step 4) then descriptive text on their performance should be provided. Where a threshold is used then a definitive answer on state or potential state of the indicator should be presented as well as an indication of the extent of the gap.

Risk analysis

Using the results of the risk analysis (step 4a.4), summarise the risk of an indicator being in an undesirable state by classifying as high, medium or low risk. Link this to the operational objectives by completing table 5.1.1.

Table 5.1.1.

Operational objective	E / SE /O?*	Indicator	Risk (high, medium or low) (see 4a.4)	Reason
*Indicate whether operational objective is Ecological (E), Socio-economic (SE) or Mixed/Other (O)				

State assessment

Using the indicators selected in step 3 and the trend assessment performed in step 4, compare the current status to the target indicator. In case the target was not quantitatively defined, provide a qualitative or semi-quantitative assessment, and describe what this assessment is based on (e.g. expert opinion, reported assessments by others). Use these to complete table 5.1.2. The extent of the gap can either be described quantitatively or qualitatively e.g. 'the current level deviates a bit/a lot from the threshold, but the trend shows a decline/decrease'.

Table 5.1.2.

Operational objective	E / SE /O?*	Indicator	Current level	Threshold	Trend	Extent of gap
D1: Reduction of fishing mortality	SE	Mortality by fishing (F hake)	0.7 - 1.0	F0.1	-80%	(1)
D1: Reduction of fishing mortality	SE	Mortality by fishing (F mullet)	1.2 - 1.4	F0.1	-80%	(1)
D1: Reduction of fishing mortality	SE	Mortality by fishing (F shrimp)	1.2 - 1.5	F0.1	-80%	(1)
D2: Enhancement of welfare	SE	Mean gross profit by vessel	98000 eur	NA	+130%	(2)
D3: Nature conservation	E	None	NA	NA	NA	(3)
D4: Sustainable exploitation	SE	ESSB/USSB (hake)	0.04	0.35	+22.57%	(4)
D4: Sustainable exploitation	SE	ESSB/USSB (mullet)	0.15	0.35	+31.91%	(4)
D4: Sustainable exploitation	SE	ESSB/USSB (shrimp)	0.12	0.35	+11%	(4)
D4: Sustainable exploitation	SE	Total fishing capacity (KW)	76104	62362	-13742	(5)
D4: Sustainable exploitation	SE	Total fishing capacity (GT)	25959	20967	-4992	(5)
D5: Cultural heritage	SE	Total number of fishermen	1884	NA	-23%	(6)

*Indicate whether operational objective is Ecological (E), Socio-economic (SE) or Mixed/Other (O)

(1) The extent of the gap for the reduction of fishing mortality is **large** since the threshold can not be attained by the full operationalisation of this objective in terms of fleet contraction, which is the mechanism used so far. Indeed, it is not possible to dismiss more than the 19% of the fleet due to legally-binding budget limitations, whereas the requited contraction should be of about 35% to meet the threshold. To overcome this limitation, both the inspiring policy and the management plan advocate a zoning scheme in the space, where large fishing exclusion areas are defined (i.e. biological protection zones, nursery grounds, easement for military purposes). However, such areas have never been established in the field, making impossible to reach the desired threshold in practice. The trend is nevertheless in the desired direction.
(2) Regarding the enhancement of the fishermen welfare, there is a gap with two components. First, a conceptual gap since the indicator is not well suited to monitor the objective, since welfare can is not accurately described by an averaged measure on a vessel basis. Second, there is a somehow **limited** gap because indicator does not take into account the (possibly large) influence of external drivers (e.g. market forces) on the value and significance of the indicator itself.
(3) Nature conservation is simply not operationalised through specific objectives, indicators and thresholds. If this should be quantified, it would be a **huge** gap since any sustainable management is based on an EB approach. Nature conservation and environmental protection appear as high level goals in all sectoral fisheries policies, but is not directly implemented in a specific national policy, neither operational objectives nor specific indicators and thresholds. Actually nature conservation can be only an indirect output of the establishment of fishing-restricted areas. Up to date, this areas are limited to MPAs that represent a very small fraction of the total study area. Much larger fishing-restricted areas, though stated in fisheries management plans (i.e. biological protection zones, nursery grounds, easement for military purposes) where never established.
(4) The gap for sustainable exploitation can be estimated as **medium** by averaging two different types of gaps between indicators and their respective thresholds.
On one hand, the mechanism to attain the threshold in the ESSB/USSB ratio is the contraction of the fishing fleet, which can not be pushed till far enough to match the threshold level. A zoning scheme was stated and is still needed to reach the threshold value, but is not implemented yet. Even if it would be, the effects should not be recorded within the programmed deadline. The trend is nevertheless in the desired direction – although it appears with opposite sign in the management plan.
On the other hand, there is a mismatch between the interpretation of the objective and the thresholds of total engine power and vessel tonnage. The indicators relate to the construction of new vessels and the upgrading of previously existing ones. In practice, the mismatch between objective and indicator values will produce a time lag as large as the turnover of the fleet.
(6) The preservation of the cultural heritage, here intended as the traditional fishing culture and particularly that of artisanal fishing, is not operationalised through specific objectives, indicators and thresholds. The preservation of job positions, the traditional culture and the enhancement of the worker welfare are high level goals in the CFP that are vanished from the management plans. As in (3), the gap is **huge** because even the first steps are completely lacking and the holders of the cultural heritage become progressively older and fewer.

In the next step, prioritise each gap in terms of the importance of meeting the operational objective i.e., identify and describe the gaps that currently deviate the most from the objective and expected future development. This ranking in terms of significance or severity includes some level of subjectivity and therefore the reasoning behind the assessor's prioritisation should be described; why is one gap considered to be more important than another? This will feed into steps 6 and 7.

Enter operational objectives in table 5.1.3 in decreasing order of priority.

Table 5.1.3.

Operational objective	E / SE /O	Gap importance	Comments
D3: Nature conservation	E	1	Essential for any sustainable development and nothing made yet
D5: Cultural heritage	SE	2	At risk of dissapearance and nothing made yet
D1: Reduction of fishing mortality	SE	3	Essential for rebuilding already depleted stocks
D4: Sustainable exploitation	SE	4	Needed for ensuring renovation of resources avoiding overfishing
D2: Enhancement of welfare	SE	5	Necessary to overcome social and economic exlusion of fishermen

Action 5.2 Assessing the level of success and importance

This action requires confirmation of whether the operational objectives have been achieved or failed and completion of a weight assessment of their importance for the development of future management options. As part of this action you should:

- Indicate in table 5.2 whether the operational objective has been achieved (A) or has failed (F), based on the results summarised in tables 5.1.1 - 5.1.3.
- Describe why the operational objective was assessed as having been achieved or failed (e.g. because the trend was positive, or the state was too low); underpin the assessment by stating the reason for the outcome of the assessment.
- Give objectives a weighting based on their need for future management and the higher level goals of the SMA, where 1 is not relevant (e.g. objective is met, so no adaptations to management are needed) and 5 is very relevant (e.g. failure to meet an important operational objective for a high level goal of the SMA so adaptation of current management regime is important).
- Include the reasoning behind the assigned weighting.

Complete table 5.2 to summarise outputs of the actions described.

Table 5.2

Operational objective	E / SE /O	Achieved or failed	Why	Relevance for future management	Reasons
D3: Nature conservation	E	F	Operational objectives lacking	5	a
D5: Cultural heritage	SE	F	Operational objectives lacking	5	b
D1: Reduction of fishing mortality	SE	F	Adequate trend but limited budget hampers achievement	2	c
D4: Sustainable exploitation	SE	F	Adequate trend but stocks largely overfished	3	d
D2: Enhancement of welfare	SE	F	Available indicators unfitted to reflect the objective achievement	4	e

(a) It is very relevant for future management because the sustainable exploitation of the natural resources, which represent many of the human activities in the study area, depend on the functionality of ecosystems that is endangered by a wide array of pressures. A zoning scheme for nature conservation is essential to ensure the preservation of many of the ecosystem goods and services in the study area.

(b) It is very relevant because appropriate actions are urgently needed to avoid that the cultural heritage of ancient fishing traditions becomes whipped out by industrial fishing. In addition, while the CFP aims to the stabilization of job positions, the stated threshold imposes a decreasing trend of number of fishermen. This reflect that the inspiring policy has not been properly conveyed to the implementing management plan.

(c) The objective is necessary and would be not achieved within the expected deadline. However the trend is adequate and the threshold will be met soon if the current trend is maintained.

(d) The objective is necessary and would be not achieved within the expected deadline. However the trend is adequate and the threshold will be met in the medium term (about 10 years) if the current trend is maintained and an adequate fishing-ban areas are established.

(e) The objective directly transposes one of the overarching goals of the CFP that pursuits the improvement of living conditions for fishermen, but the available indicators are largely unfitted to describe the welfare level of the fishermen sector.

Action 5.3 Reassessing indicators and thresholds

Step 3 of this manual (table 3.2.1) describes the criteria for selecting appropriate indicators and thresholds. It provides an opportunity to evaluate how effective indicators and thresholds are in conveying the success or failure of operational objectives. Using table 5.3, for each indicator, enter the information that is available, substantiate each score and where relevant give suggestions for improvement.

Table 5.3

Indicator	Evaluation Question*[1]					SUM	Viability Score (from step 3)
	Does the indicator provide a response directly related to the intended objective?	Were the indicators and thresholds easy to communicate (especially to stakeholders)?	Were sufficient data available to measure the indicator? (Refer to uncertainty assessments)	Is the indicator sensitive enough to change over the relevant temporal scale as defined by the management initiative?	Was the indicator cost effective?		
Mortality by fishing (F)	3	1	2	3	3	12	26
Mean gross profit by vessel	1	2	2	2	3	10	21
ESSB/USSB	3	2	2	3	3	13	24
Total fishing capacity	2	3	3	3	3	14	28
Total number of fishermen	1	3	3	1	3	11	22
	*[1] Score (good = 3; medium = 2; poor = 1)						

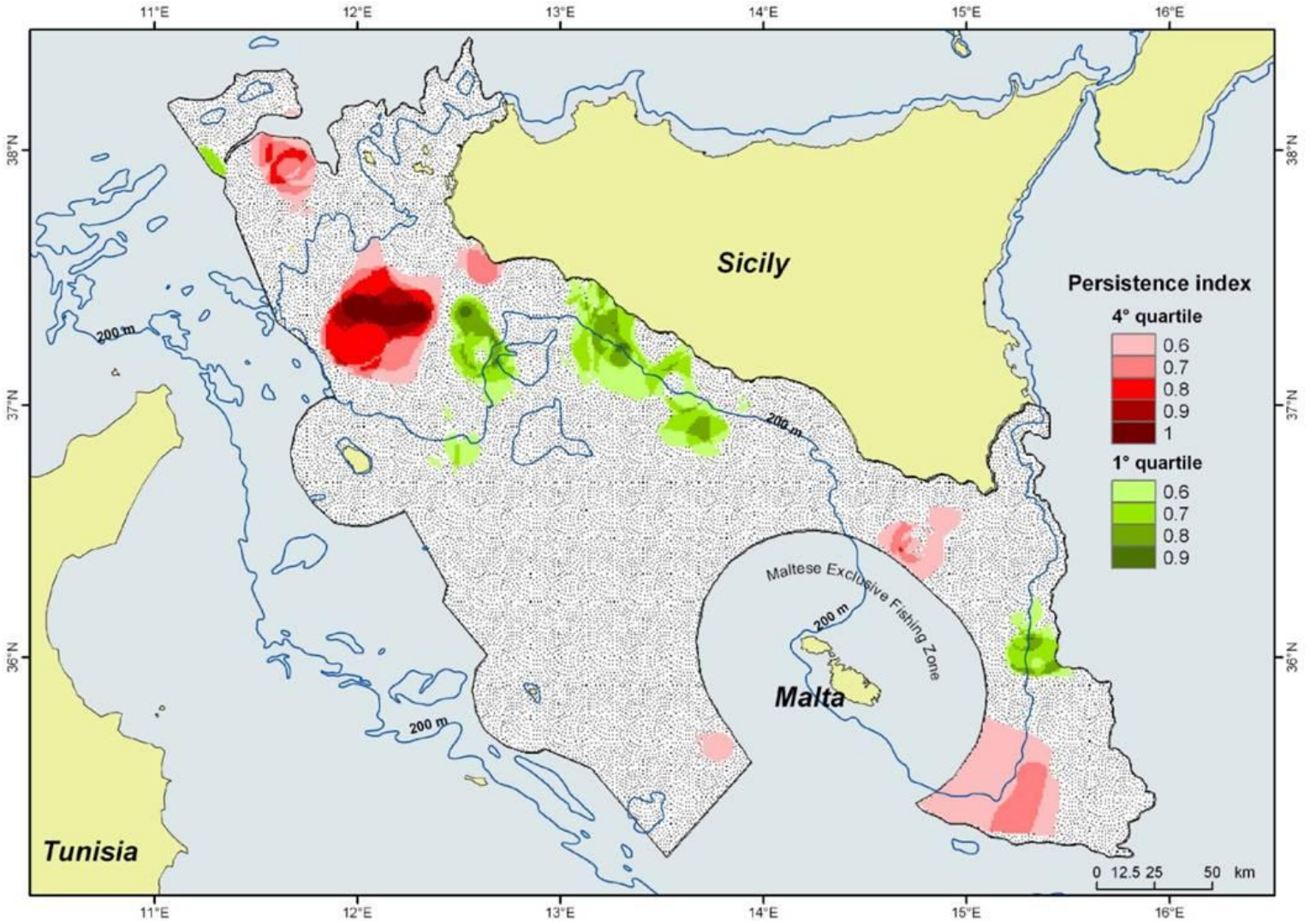
Score from action 5.3 assessment:
5-8 = Indicator's performance was poor and an alternative indicator should be developed to assess that type of objective. In step 7, suggestions need to be made with regard to this and may include the need for better definition of the indicator, the collection of more (monitoring) information, or use of alternative indictors that may be more cost-effective.

9-12 = Indicator's performance was medium. Take some time to look into the areas where the indicator did not perform well (e.g. cost effectiveness) before assessing if a change to the indicator is necessary.

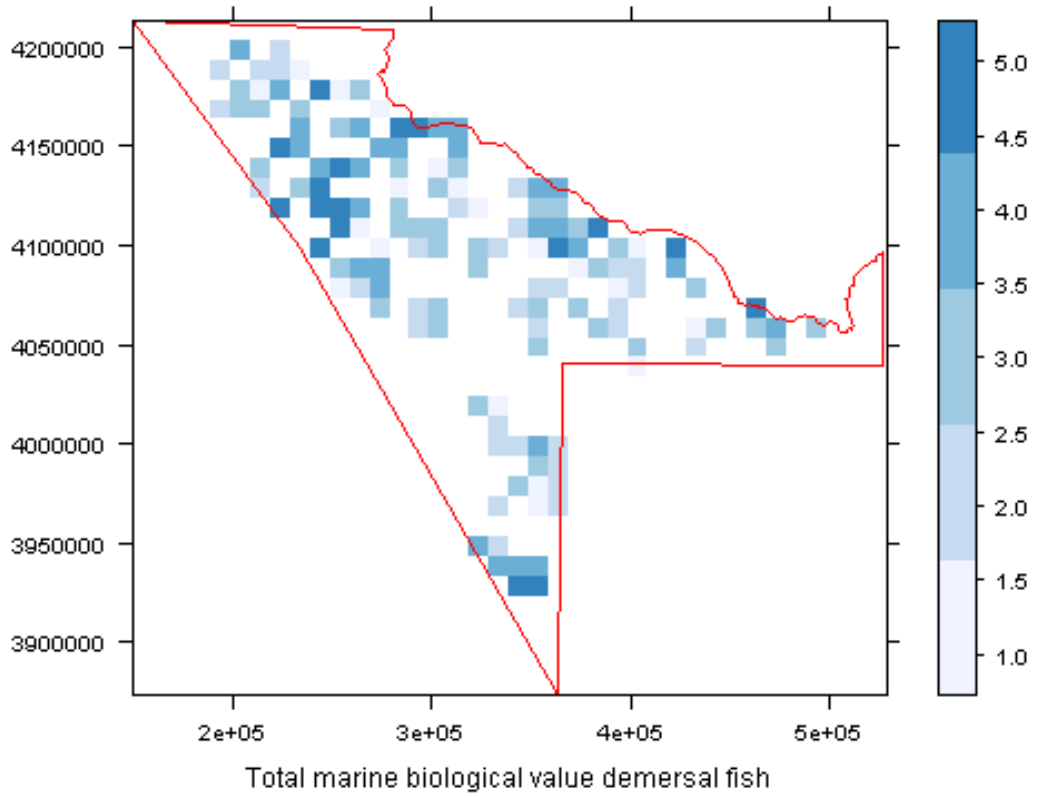
13-15 = Indicator's performance was good and should be reported as a useful indicator to assess that particular objective.

The performance of the indicator can, therefore, be summarised using the two scores from steps 3 and 5 (table 5.3).

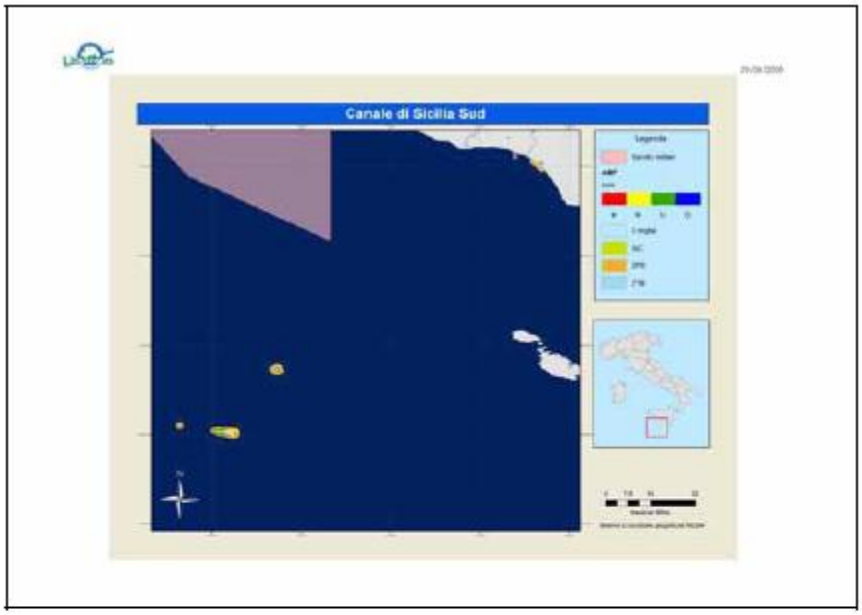
Map of the spatial distribution of demersal biodiversity from Fiorentino *et al*. (2007)

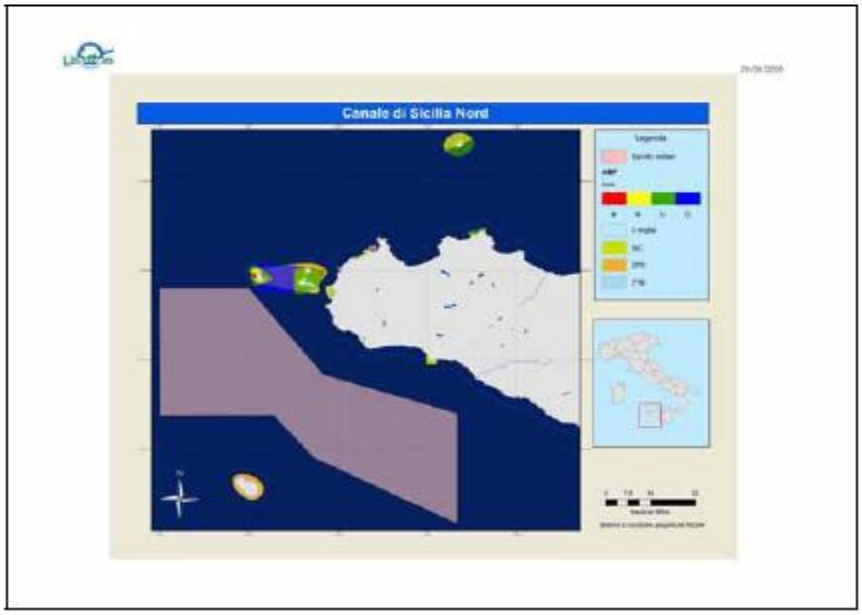


Map of the spatial distribution of demersal biodiversity as BVM

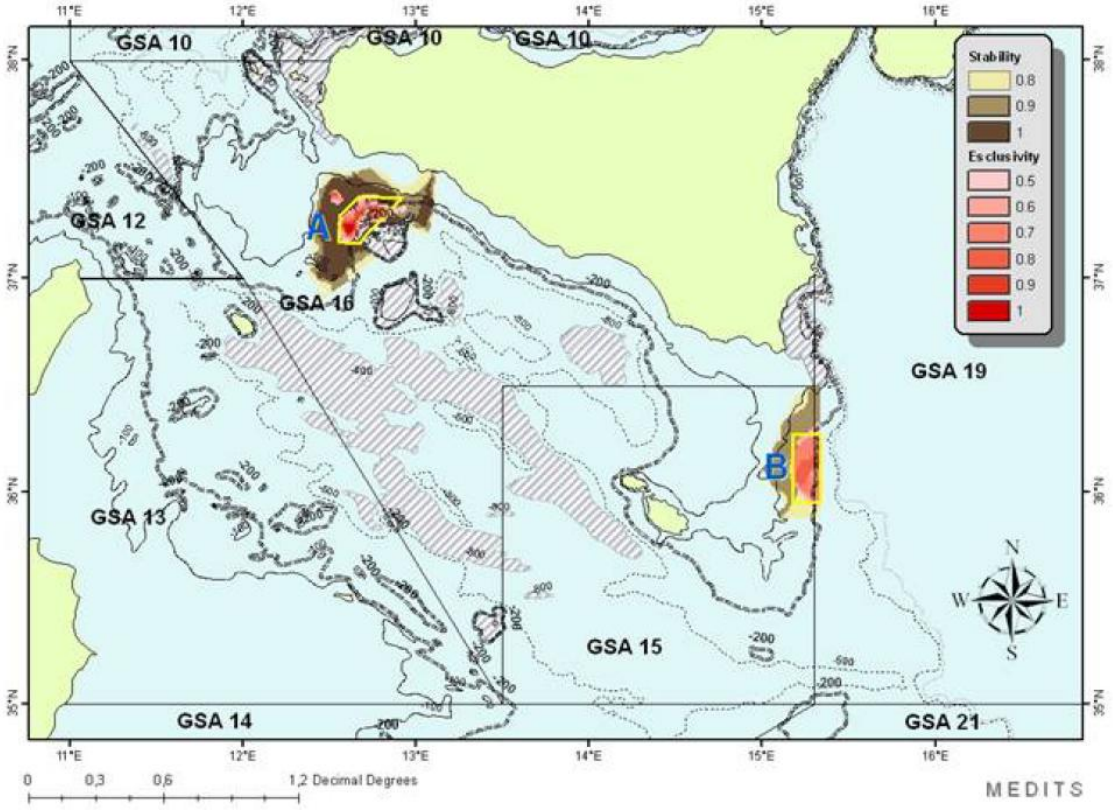


Map of some of the protected areas stated in the off-shore trawl-fishing management plan of the GSA 16 (Italy). These areas are not enforced and trawl fishing is regularly carried across the whole area. See the map of the spatial distribution of fishing pressure in Step 2b.

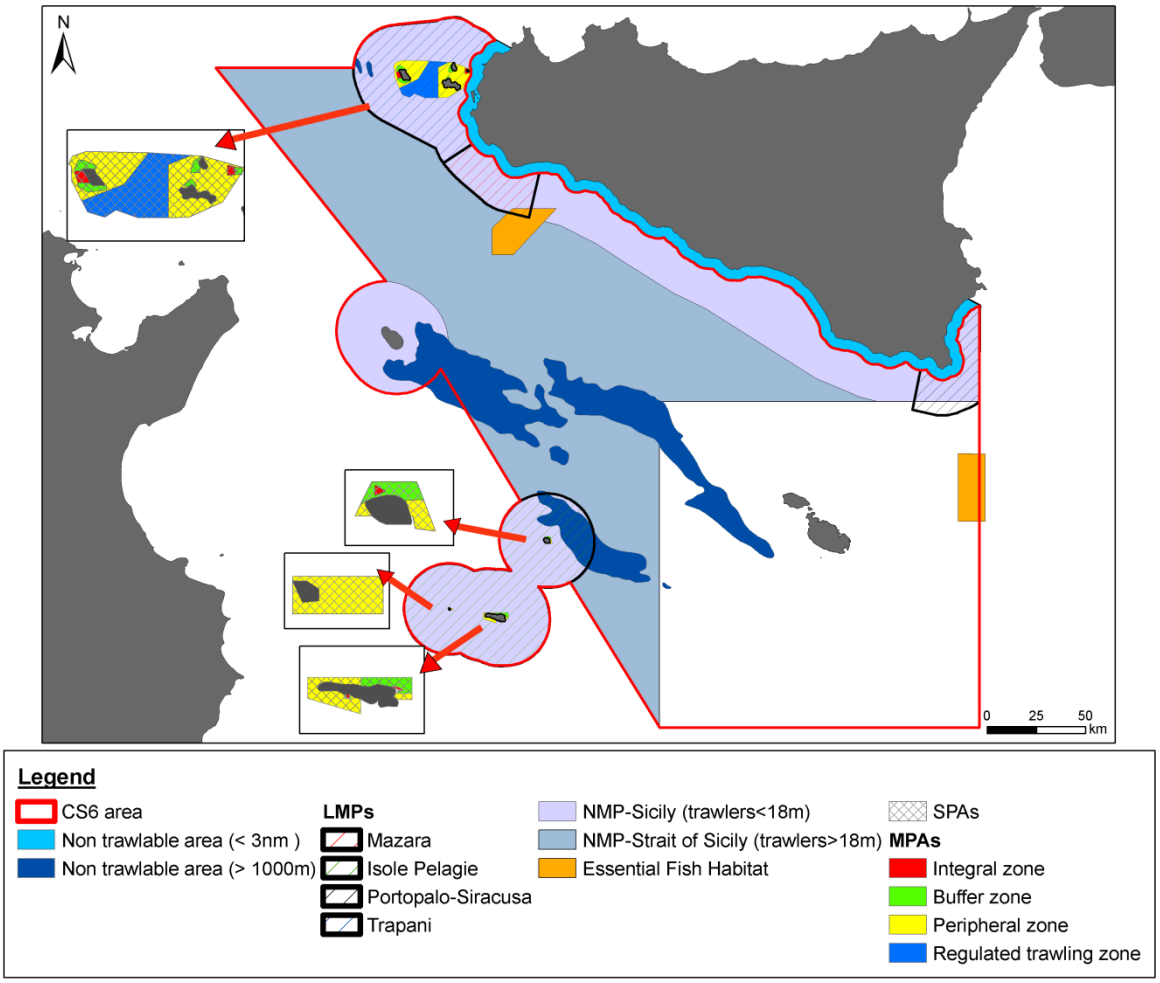




Map of the two Biological Protection Zones (labeled A and B) for the nursery grounds of the hake, as stated in the off-shore trawl-fishing management plan of the GSA 16 (Italy). These areas are not enforced and trawl fishing is regularly carried out there. See also the map of the spatial distribution of fishing pressure in Step 2b.



Map of the zoning scheme regarding trawl-fishing. Note that fishing effort extends well over areas where such activity is banned. See also the map of the spatial distribution of fishing pressure in Step 2b.



Step 6 Evaluate management effectiveness

The aim of step 6 is to evaluate the success of existing or planned management measures in terms of achieving the operational objectives (implemented or recommended). Where there is no management plan in place, existing management measures can be evaluated to ascertain how they might contribute to achieving operational objectives. This will identify possible gaps where new management measures might be needed.

Step 6 involves assessment of the success of the management measures (as defined in step 2c) in light of the objectives (step 1b) and discussion about why individual management measures were or were not successful in achieving operational objectives (as listed in step 5). The output of this step will be a table showing which management measures were/were not/were partly successful in meeting their objectives. The table will be accompanied by explanatory text that focuses on the objectives that have not or only partly been met and will consider possible reasons for these outcomes, with respect to management measures in place.

It is important to recognise that management effectiveness in achieving the goal/objectives for each SMA will be evaluated on a scientific basis and this evaluation will examine the key pressures from particular sectoral activities, identified through previous steps of the MESMA framework. To complement this scientific evaluation, it is important to understand the views of different stakeholders (governance, management, operational and others) on the validity of objectives and effectiveness of existing management measures in achieving those environmental goals/objectives. It is also important to understand the process by which those stakeholders interact with each other. To some extent this is explored through WP6 governance research. The Governance Analytical Structure will include discussions of the effectiveness of existing governance approaches and incentives used. The final output of this step should identify where adaptation to current management is needed and this will feed into step 7.

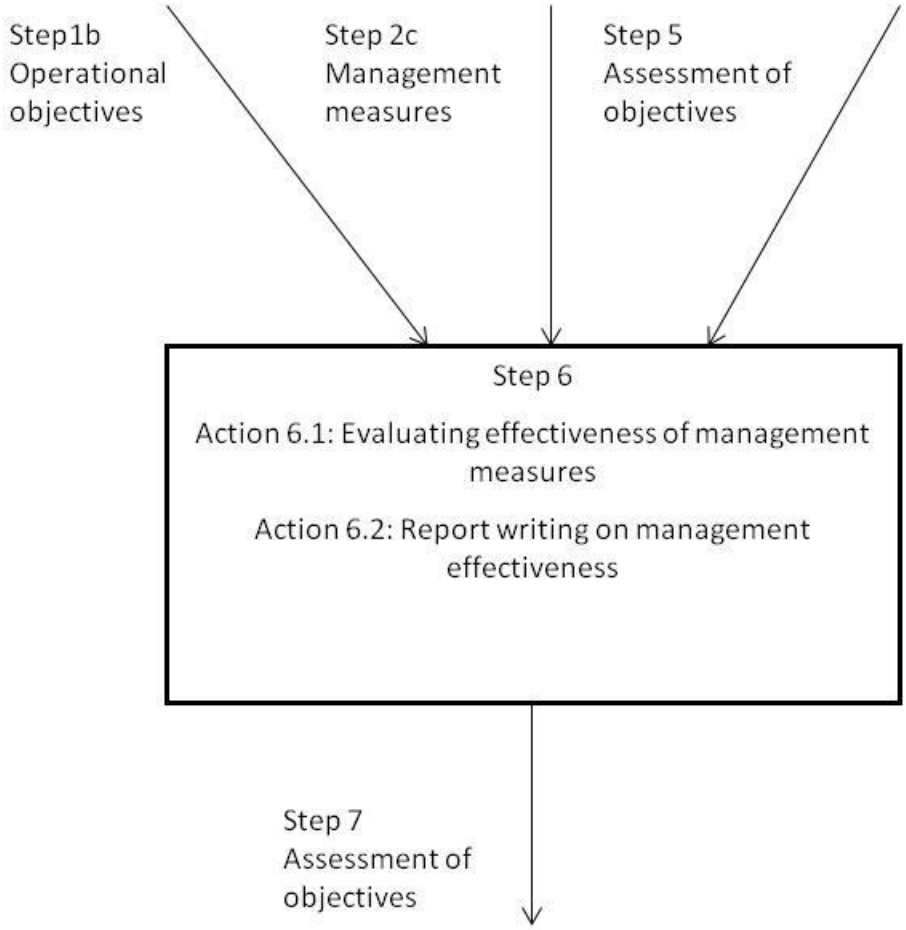


Figure 6.1. Work flow for step 6.

Action 6.1 Evaluate effectiveness of management measures

Using the outputs from steps 1b, 2c and 5, summarise the management measures that are being used to help achieve the respective operational objectives. Where a management plan or initiative exists, populate table 6.1 with the relevant management measures and operational objectives. Where there is no management plan or initiative in place and no measures are set for specific objectives, enter information about existing management measures in table 6.1 and link these to how they might contribute to the operational objectives. You may wish to amend the table to accommodate any additional information.

Table 6.1.

Operational objective	Management measure	Useful? yes/no/partly	Achieved? yes/no/partly
D1: Reduction of fishing mortality	Definitive dismess of vessels	yes	partly
D1: Reduction of fishing mortality	Temporal stop for biological rest	partly	yes
D1: Reduction of fishing mortality	Temporal stop for technical reasons	partly	yes
D4: Sustainable exploitation	Minimum total lenghts	no	partly
D4: Sustainable exploitation	Net size	partly	partly
D4: Sustainable exploitation	Trawl-ban areas areas (Biological Protection Zones)	yes	no
D4: Sustainable exploitation	Trawl-ban areas areas (other)	yes	no
D4: Sustainable exploitation	Zones of limited access	yes	no
D4: Sustainable exploitation	Release of fishing permits	yes	NA
D4: Sustainable exploitation	Monitoring of fishing effort via VMS	yes	NA
D4: Sustainable exploitation	Ecolabeling	yes	no
D2: Enhancement of welfare	Ecolabeling	yes	no
D5: Cultural heritage	Ecolabeling	yes	no
D3: Nature conservation	None	NA	NA

Where the effectiveness of an existing management plan or initiative is evaluated, table 6.1 should be used to discuss for each operational objective which management measures have contributed most to the success or failure of an objective. This exercise is largely based on expert judgement, so it is important to select individuals with the relevant background and expertise (and it may be helpful to keep a record of who is completing the evaluation). It is also important to integrate expert opinion with stakeholder views to give a full picture of the effectiveness of each management measure, together with their distributional effects. Since stakeholders' views and perspectives on the effectiveness of management measures are explored through governance research, please refer to section 5.1 in the Governance Analytical Structure. This section, in particular, summarises the key incentives that have been applied to promote the achievement of the priority operational objective and addresses related conflicts in the existing initiative under evaluation; also included is an indication of how a particular individual or combination of incentives has been particularly effective or ineffective. The exercise lists and elaborates on the incentives drawn from Appendix III of the 'Guidelines for MESMA WP6 Governance Research'. However, only incentives that are applicable / relevant to the initiative under evaluation are listed and evaluated. Note that in WP6, the effectiveness of incentives may be determined from expert judgement, interviews with stakeholders or other information.

Section 5.1 of the Governance Analytical Structure is not available for the Strait of Sicily yet, so the following evaluation is exclusively based on expert judgement that also takes advantage of the knowledge of other colleagues working on the field.

In cases where no existing management plan is evaluated the assessor should list the suggested management measures in relation to the assessed operational objectives and provide some narrative as to why certain management measures are expected to be successful. This narrative should be directly extracted from the results of the risk analysis (step 4a).

Action 6.2 Write a report on the management effectiveness

Next, write a report on the current management effectiveness. Where an existing management plan or intiative has been evaluated and the assessor has been able to undertake a state assessment, the report should be based on both the overall findings of the governance analysis and information from the previous steps and action 6.1. This will feed into step 7 and should include:

- A discussion of the current management system and where it has been successful or where it is failing.

- A list of gaps where new management measures are needed in order to meet the operational objectives (this applies where there is no management plan in place).

- Consideration of why the management measures have been useful or not, including environmental, socio-economic and governance reasons.

Where there are management plans under development or created but not implemented and a risk assessment has been undertaken, the report could:

- Provide a summary of where management measures might be needed in order to achieve the operational objectives.

- Consider the expected (ecological and economic) impacts of different recommended management measures (although this will be further examined in the exercise to develop alternative scenarios in step 7).

Please use the following structure when writing the report:

- Write short summary paragraphs on each objective from table 6.1 focusing individually on the management measures that (i) were successful; (ii) were partly successful; (iii) were unsuccessful. These paragraphs should each include ideas on why management measures were successful / partly successful / unsuccessful.

- Summarise whether each management measure was mainly successful / partly successful / unsuccessful in contributing to the objective. This should include a critical evaluation of whether or not the taken management measure is linked well to the operational objective.

- Where applicable, discuss gaps where new management measures are needed to help achieve the operational objectives.

Report on management effectiveness (Action 6.2)

The following report is focused on nature conservation and fisheries in a part of the Strait of Sicily. Both uses are interlinked since the sustainable exploitation of natural resources necessarily rely on functioning ecosystems in a healthy environment. Reciprocally, industrial fishing exerts by far the heaviest pressure on the environment.

For the above mentioned reasons, nature conservation pervades high level goals of fishing policies and management plans. However, there is not an specific management plan for nature conservation in the study area. In contrast, there are several management plans for fisheries, both by industry segments and by geographical sub-area (GSA). Hereafter, the management plan for the off-shore trawling fisheries in the FAO GSA 16 is assessed. Although other management plans exist for different segments of the fishery industry, the focused plan covers most of the area and is highly representative. Indeed all fisheries management plans share analogous goals and objectives, as well as difficulties and problems.

The most striking characteristic of any fisheries management plan is the lack of coherence, both with respect to the inspiring policies (CFP, national strategic plan and national operative plan) and also internally (from high level goals to operational objectives down to indicators). For these reasons,

operational objectives were distilled and re-stated to make them tractable through the FW, in the following terms:

(D1) reduction of fishing mortality (referred to fishing within safe biological limits)

(D2) enhancement of the workers welfare (referred to as economic income)

(D3) nature conservation (referred to as recovery of the natural communities)

(D4) sustainable exploitation of the resources (referred to as stock recovery)

(D5) preservation of the cultural heritage (referred to as job positions).

Regarding the objective D1- reduction of fishing mortality - is correctly pursued through the definitive dismiss of vessels. Unfortunately, the management measure has been implemented too late (on June 2010 for the period 2007-2013) and the required reduction of the fleet is too large (estimated to be of 80%). The magnitude of the reduction and the shortage of time make impossible the fulfilment of the objective, among other reasons because legally binding obligations require funds larger than those actually available. For this reason, the plan identify a complementary set of measures, namely the temporal stop for biological and technical reasons. These are of limited utility since the combination of the stops sums up 60 days over the year, which is a too little figure. These measures were however achieved, mainly because they were traditionally pursued in previous years and subsidized.

Objective D2 – enhancement of the welfare - appears hard to reach when placed in the context of a massive contraction of the fishing fleet. The management initiative for obtaining an ecolabel for some fishing products is very good indeed. In fact it could be the only way to enhance income while reducing catches in the short term. Unfortunately, it has never been implemented and, given the fact that the application takes some time, it will be not achieved within the deadline of the management plan. This

Objective D3 – nature conservation – is simply not operationalised. The issue is raised in the general description of the high-level objectives but it vanishes at the operational level. There are not operational objectives, neither indicators nor thresholds that could be linked to this objective. The citation of several forms of protected areas (discussed in D4 below) was never implemented, apart of few little MPAs that already existed without relative management plans. This omission represent a fundamental gap that must be tackled in future management plans and initiatives.

With respect to objective D4 – sustainable exploitation of stocks – there are a number of management initiatives. Some measures (minimum catchable sizes, net sizes) already stood for long time in traditional management initiatives so that they are more feasible. However, their utility for sustainability purposes is very limited: the stock is supported by spawners rather than young individuals, so fishing selectivity should be aimed to the protection of large individuals. The spatial zoning scheme proposed by the plan (biological protection zones, other types of trawl-ban areas plus zones of limited access) is ambitious and would be much more effective in protecting spawner individuals and hence supporting sustainability. However it has never been implemented. The only implemented measure consist in the prohibition of trawl-fishing in MPAs, which is redundant since the prohibition already existed. It is also useless since MPAs cover less than 1% of the study area: a figure much lower than the estimated requirements.

Additional measures encompass the release of fishing permits and the control of the spatial distribution of fishing effort through VMS. The release of fishing permits allowing for quotas has proven successful in many instances. However, such success is tightly linked to an effective enforcement, which hardly exists in the study area. The reason is that the plan establishes a control mechanism that has never been implemented: VMS (gathered by the ministry of fisheries) should warn enforcement bodies (depending on the ministries of defence and interior) about infractions regarding quotas and exclusion areas. To our knowledge, such mechanism has never operated and the exclusion areas (apart of the already existing MPAs) were never implemented. This explain why the distribution of fishing effort appears unrelated to these management initiatives, as can be seen in the map of the distribution of fishing effort (annexed). Obviously, the implementation of the stated measures or equivalent ones constitutes an important gap in the management of the study area.

Objective D5 - preservation of the cultural heritage in terms of job positions – consists, in practice, in the limitation of the economic impact derived from the huge contraction of the fishing effort. The objective, as stated in the plan, is not linked to any management measure. The stated indicators (number of fishermen and cost by worker) are poorly fitted to display the degree of achievement of the objective: they describe the economic impact instead of the success in limiting it. Thus future management initiatives should consider the necessity of defining actions aimed to achieve the objective. The later should be stated in terms of preserved job positions and secured incomes. In the meanwhile, the creation of ecolabels could be considered the only current action somehow helping to preserve job positions by increasing the net revenue and thus the incomes of the workers. Unfortunately, such action has never been implemented.

In summary, the management of off-shore trawl-fishing display the correct trend but is plagued with gaps. These result from the lack of coherence at two levels.

A first level of incoherence is located between the management plans and the inspiring policies. Indeed the plans appear formally aligned with the high level policies but the underlying concepts and ideas seem to vanish in the process toward implementation. This is particularly the case for objectives related to nature conservation and the enhancement of the fishermen welfare. The ultimate cause could be a management vision over a too narrow temporal window.

Other gaps result from the lack of coherence with other policies, and the complexities of implementing so many different policies on the very same area. This is particularly evident in the incapacity to carry into effect the implementation and enforcement of a zoning scheme that could suffice the stated goals.

Step 7 Recommend adaptations to current management

Depending on the suitability of the current management regime, adaptations might be needed. The aim of step 7 is to write a report on adaptive management needs for the SMA. In order to write this report, results from steps 5 and 6 are used to determine if adaptations to current management are needed and results are prioritized according to action 5.1. Alternative policy scenarios are developed, improvements in management strategies are recommended and a reality check of the recommendations is performed. Recommendations are also checked against EU policies. Finally a report on adaptive management needs for the SMA is written. The output is the report on adaptive management needs for the SMA.

Step 7 links to sections 5.2 and 6 of the Governance Analytical Structure (WP6) by assessing the governance approaches that could support the implementation of the management recommendations. Section 5.2 of the Governance Analytical Structure considers incentives that could potentially improve governance and section 6 discusses cross-cutting institutional issues. Hence, step 7 is the key stage at which the MESMA framework and the governance research analyses are integrated or 'blended', drawing on: 1) The validity and feasibility of the goal/objective from a governance analysis perspective and scientific perspective (generic framework); 2) Potential restrictions suggested from a scientific perspective (generic framework), for example temporal/spatial restrictions or complete bans on particular sectoral activities that lead to pressures that undermine effectiveness of achieving goals and objectives; 3) The validity and feasibility of implementing these restrictions from political, legal, policy and stakeholder perspectives (governance analysis).

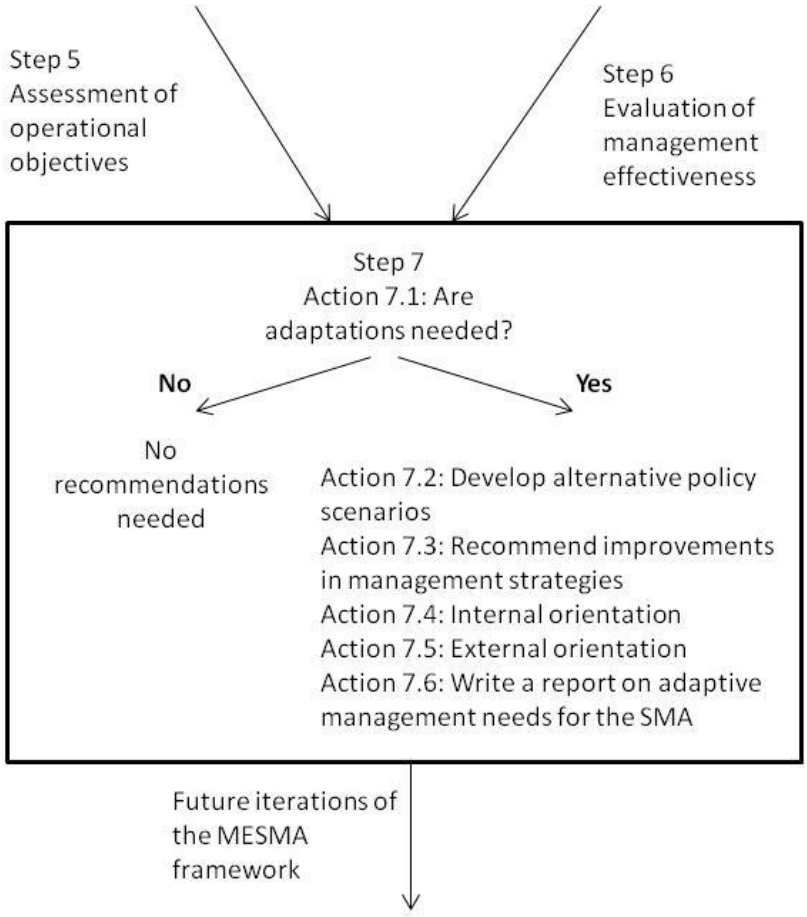


Figure 7.1. Work flow for step 7.

Action 7.1 Using the outputs from step 5 and 6, identify if adaptations to current management are needed

Use the outputs from step 5 and 6. Are there any gaps or drawbacks?

Yes.

- If no, then no recommendations are needed. Go to action 7.6.
- If yes, proceed to action 7.2.

Action 7.2 Develop alternative scenarios

In this step, the term 'scenario' is applied to an alternative future scenario and means 'a well-defined, connected sequence of features, events and processes that can be thought of as an outline of a possible future condition of the repository system' (see glossary). In this context, a scenario based approach is a technique for presenting alternative futures to decision makers. At the end of the process, it may be practical to present management with a selection of two or three alternative scenarios (with a focus on specific management measures), as this may help to focus attention on the most important issues.

Scenarios might include, for example, a key change or break-through in the planning or legislative process, more space for stakeholders to influence the policy process, or more input from scientists (i.e. different means of achieving an objective, as considered in the Governance Analysis). Other scenarios might include re-definition of operational objectives. Developed scenarios should not be purely hypothetical, and a reality base for the scenarios is needed, for example, through grounding your scenarios on real examples in the vicinity of the case study area. A description of the incentives that could support these scenarios could be provided (and this could draw on some of the information from Appendix III of the Governance Analytical Structure).

In order to develop alternative scenarios, it may be helpful to re-define operational objectives. Use the priority list from table 5.2 to choose operational objectives for scenario writing. Next, select the main type of the alternative scenario to develop: 1) studying the facts of a situation, 2) selecting something that may happen (for instance seawater warming (an environmental scenario) or a change in policy), and 3) imaging the various ways for that development to occur and the sequence of events that it might follow. For types 2 and 3, apply trend-impact analysis as a method to predict the future by looking at the effects of trends over time and decide the main drivers for change.

The following operational objectives were derived for the fisheries management plans of the Italian counterpart of the Strait of Sicily.

D1: Reduction of fishing mortality by (roughly) 20% within 2013
D2: Enhancement of the welfare of fishery workers by 2013
D3: Nature conservation and 20 % reduction of loss of specific biodiversity components by 2020.
D4: Sustainable exploitation of fish stocks within 2013.
D5: Preservation of the cultural heritage associated to fishery.

Conservation objectives were synthesized from the several sectoral management plans in place, and re-stated to align them with the inspiring policies: the Common Fisheries Policy, the Marine Strategy Framework Directive, the Habitats and Birds Directives, as well as the 2020 Biodiversity Strategy. The Water Framework Directive, although being relevant, is applicable to a small fraction of the study area (the coastal waters of the islands). The operational objectives incorporate terms that were found to be common across different policies, legislative documents, regulations and management plans.

Fisheries objectives were derived from high level documents (policies and laws) as well as the sectoral management plans already in place. These were two Italian national frameworks (the Italian National Strategic Plan for Fisheries and the Italian National Operative Program 2007-2013) plus a number of plans for different

fisheries segments (the Management Plan GSA 10 Middle-South Tyrrenian Sea for trawl, the Management Plan GSA 16 (Sicily Strait) for trawlers > 18m LOB, the Management Plan (Sicily) for trawlers < 18m LOB, the National Management Plan for boat seines, the Management Plan of the Sicilian fleet of purse seines for small pelagic fishes, the Sicilian Environmental and Energetic Plan, as well as the Local Management Plans for the maritime compartments of Trapani, Mazara del Vallo, Pelagie Islands, and Pantelleria Island). The derived operational objectives are intended to catch the rationale of the high level policy of reference (the Common Fisheries Policy) by taking into account environmental concerns and the preservation of the cultural heritage held by the workers of the fisheries sector. However, these aspects become lost in the process of conveying them from high level policies to local management plans.

Climate change was considered as an external driver. In the present context "external drivers" are referred as the forces driving system change that are not under the control of policymakers. Rather than quantitative predictions for the study area, the effects of climate change effects were explored through the expected variation in the rate of invasion by exotic species since this issue is of special relevance for the EU 2020 Biodiversity Strategy.

In addition, the envisaged development of the energy industry was considered as an internal force in order to generate qualitative scenarios.

FACTS OF THE SITUATION

Conservation

Nature conservation is considered a priority in the European policy, as well as in many regional and international treaties. The Strait of Sicily encompasses two subregions, the Italian and the Maltese ones. Maritime jurisdiction is rather complex and includes Italian and Maltese territorial seas, and Ecological Protection Zone for Italy (established in 2006), and an Exclusive Economic Zone (established in 2004) for Malta.

The Strait of Sicily holds important species and habitats that deserve protection, based on the following conservation criteria:

(a) Uniqueness or rarity. Habitats/species/geomorphological features that could be considered rare, depending on the scale of observations, include:

(a.1) Geomorphological features: Submarine volcanic activity; mud volcanoes; (potential) cold seeps.

(a.2) Habitat forming species: The scleractinian coral *Cladopsammia rolandi* (endemic to the Mediterranean), cold water deep-sea coral mounds composed of *Lophelia pertusa*, *Madrepora oculata* and *Balanus* spp., the yellow tree coral *Dendrophyllia cornigera*, the octocorals *Isidella elongata*, red coral *Corallium rubrum* and *Funiculina quadrangularis*. The potential presence of cold seep communities. Coralligenous communities and "mäerl" beds exist in places where bottom trawling is not allowed.

(a.3) Other species: Maltese skate *Leucoraja melitensis* is now confined largely to the Sicilian Straits. A colony of an undescribed species of large deepwater oyster (*Neopycnodonte* sp.) has been recorded living on fossilised coral mounds in the Linosa Though.

(b) Special importance for life history stages of species. Interactions of hydrological features with the bottom relief create suitable spawning and recruitment conditions for a number of demersal and pelagic species, as well some of them that are of economic and ecological importance.

(c) Importance for threatened, endangered or declining species and habitats. Bottlenose dolphins inhabit inshore waters around the Pelagie Archipelago. Striped dolphins and fin whales are also present in the area, while loggerhead turtles, leatherback and green turtles are observed occasionally. The Maltese skate, great white shark, porbeagle, shortfin mako, sandbar shark, giant devil ray, and blue shark are also present. Bluefin tuna populations are declining drastically as a result of overfishing.

(d) Vulnerability, fragility, sensitivity, or slow recovery. Benthic habitats and communities summarized in point a.2 are vulnerable and fragile. Species specially sensible to human effects and slow to recover include: fin whales, numerous species of elasmobranchs and turtles.

(e) Biological productivity. Total biomass of demersal fish species is particularly high on the Adventure Bank, to depths of 100 m. Other specially productive benthic habitats include those in point a.2 above.

(f) Biological diversity. A persistent area of high demersal fish species diversity is located on the Adventure Bank, to depths of 100m. High demersal fish species diversity is also recorded at 400 – 600m in the northwest of the Sicilian Straits and on the eastern edge of the Maltese EEZ. Benthic habitats with high associated species diversity also include those summarized in point a.2.

Protection in the region is generally at the level of the territorial seas, where nation legal frameworks are in rule (basically the act 979 for Italy and the Flora, Fauna and Natural Habitats Protection Regulation plus the Environment Protection Act for Malta). Italy has already established Egadi and Pelagie Marine Reserves and the one of Pantelleria has been recently established. Malta has two Integrated Coastal Zone Management (ICZM) plans (Ghajn Tuffieha Bay since 1997 and Ramla Bay since 2001). Apart from this, Malta also has some protection areas around shipwrecks and three marine protected areas. In addition there are NATURA 2000 sites which, for the Italian counterpart, mostly coincide with the Marine Reserves and in Malta is the Rdum Majjiesa to Ras ir-Raheb protected area.

Additionally, an international process is aimed to establish large-size high seas MPAs in the region, including vast areas of the Strait of Sicily proposed by Greenpeace, WWF and ACCOBAMS (see http://medabnj.rac-spa.org/).

The above mentioned initiatives of protection in the region are not coordinated, the exception being the network NATURA 2000. Generally, managing plans for protected areas are lacking in Italy and very little scientific information is available across the whole study area.

Exploitation of fossil fuels

The demand for energy is continuously increasing in Europe. As an indication of the trend, the volume of gas imported to Europe through the Strait of Sicily by pipeline has been multiplied by a factor of 3 during the last thirty years: from $12.3x10^9$ m^3 per year by 1983 to $38.3x10^9$ m^3 per year by 2012.

Exploration of gas and oil deposits is increasing off the southern coast of Sicily and around Malta. Concessions covering an estimated area ranging from 8000 to 16000 Km^2 of the Strait of Sicily are been released by the Italian Ministry for the Economic Development, while heavily contested by the Sicilian Government and coastal municipalities. In Malta, drillings have been carried off the south coast by July 2011. The Resources Ministry is the authority involved in the assessment of oil drilling in Malta. Concessions extend well over the territorial sea, since national sovereignty covers the whole continental self for the exploitation of subsoil resources. Although concessions are valid for five years, they can be (and have been) “frozen” by the oil companies owning the exploration and cultivation (i.e. extraction) rights.

The concessions are released for exploration or cultivation of hydrocarbon deposits. Seismic shooting is intensively used for exploratory purposes. Subsequently wells are drilled and finally oil is extracted on platforms for a number of years. Until recently, only three oil platforms existed on Sicilian waters plus a few oil wells located in Malta.

For forecasting purposes, it is worth to consider the arrival of new drilling and extraction technologies during the last ten years, which made the exploitation of previously inaccessible hydrocarbon deposits feasible and economically viable. These methods are collectively called “fracking”. Oil and gas obtained through fracking are regarded as “unconventional” ones.

Fracking allows the exploitation of hydrocarbons locked in shales, which are abundant in continental shelfs and self-edges in Central Mediteranean. The reserves of unconventional hydrocarbons are generally large and,

more important, would provide energetic independence to many developed countries. This argument is being considered important enough to counterbalance associated environmental impacts as the global warming that can be expected from burning the massive reserves of unconventional hydrocarbons to carbon dioxide.

Fracking consist in a combination of deep precision horizontal drilling with hydraulic fracturing of non-porous rocks holding oil and gas. Precision drilling allows to deploy a pipe that follows the shape of the shale deposit. A fluid containing (undisclosed) flocculants and sand is subsequently injected at high pressure through holes in the well casing, provoking fractures in the non-porous rock bed. After ceasing the pressure, the gas and oil flow into the pipe through the holes, while sand maintain the fractures in the rock open. Releasing of substances from the subsoil after drilling is considered to be absent, but accumulating evidence suggest that is not impossible.

Wind-generated energy

Wind-mills are electricity generators moved by the energy of wind. In principle, aeolic generators do not consume limited resources (other than space) and do not generate green-house gases. Therefore the electricity obtained from wind is usually referred to be a “green” one. Generators are placed onto towers high enough to intercept winds free of shear with the sea surface. Towers can be fixed directly to the sea bottom or through an anchored platform that lays under the sea surface. Single towers are linked through an electrical network that transport electricity to accumulators located on land.

There are several projects for the construction of wind-mill farms in the banks of the Strait of Sicily in the next few years. These include the Adventure bank (with a total power of 60 MW), the Pantelleria bank (168 MW) and the Talbot bank (354 MW). Malta is also proposing to introduce an off shore wind farm close to shore at Is-Sikka l-Bajda which is located on the North-East coast of Malta, about 1.5 km off the coast of Rdum tal-Madonna, limits of Mellieha. The proposed Sikka l-Bajda wind farm would be located 3 to 5 km from the tourist accommodation area of St. Paul’s Bay, Bugibba and Qawra and 5 km away from Ghadira beach.

Biological invasions under climate warming

Small, semi-enclosed seas like the Mediterranean can be regarded as early indicators of the effects of climate change. This is due to their relatively small volume of water and the strong influence of the surrounding land masses with respect to the oceans. Such small volume of water provides little thermal inertia, while the proximity of the land masses implies intense heat exchanges and the substantial influence of river freshwaters. The result is that oceanographic patterns that influence marine life, like nutrient cycling, surface water circulation, vertical mixing and stratification of water masses, upwellings, concentration fronts and retention gyres, will change faster in the Mediterranean than in the oceans. This is specially the case of the Strait of Sicily, which is both shallow and strongly influenced by the energy of the water fluxes between the western and the eastern Mediterranean sub-basins. In fact, such energy is the main cause of the high biodiversity and productivity values found in the area. Global warming is changing the balance between those fluxes and is suspected that the oceanographic circulation pattern is already changing. Other oceanographic features could also change or become disrupted.

The Strait of Sicily is one of the main shipping routes of the world, linking the North Atlantic area to the Indo-Pacific one. This provides a privileged vector for the spread of exotic (or alien) species. Although biological invasions have been reported by both Atlantic and Indo-Pacific species, the second group can be expected to become progressively dominant. The reasons are is that the Mediterranean fauna is biogeographically close to that of the Indo-Pacific area. Moreover, the Mediterranean is becoming warmer. Therefore the Indo-Pacific fauna is adapted to environmental conditions quite similar to those found in the Mediterranean Sea. Until recently, migrations through the Suez Canal were largely curtailed by the salinity barrier represented by the Bitter Lake. However, the dilution of the salt deposits of the lake is progressively changing the picture. This evolution could be even accelerated by the planned enlargement of the capacity of the canal.

There are several hundreds of exotic species already established in the Mediterranean. While it is generally agreed that only a small fraction of invasions has noticeable effects, it is also know that some invasions lead to

the substitution of local species by exotic ones, local extinctions, parasite booms, changes in the composition of ecological communities and also in the type and intensity of interactions among species. In a few cases, the changes prompt dramatic consequences for the economy and the biodiversity of the area. For example, some fisheries collapsed when fish larvae were massively predated by an exotic jellyfish in the Black Sea; and coastal rocky communities are currently subjected to smothering and burial in coastal Turkish waters after the bloom of an exotic coccolith. More rarely, exotic invasions can have positive effects, like exotic fishes supporting or diversifying some fisheries in Israel.

WHAT IS (OR COULD BE) GOING TO HAPPEN.

It has been already settled that global warming is ongoing all over the world, and there is little doubt that green-house gases from the combustion of fossil fuels speed up such climatic change. The Strait of Sicily is particularly sensible to the effects of climate warming due to the complex interplay of oceanographic features fuelled by the movement of distinct water masses differing in salinity and temperature.

The projected increase of the capacity of the Suez Canal will further prompt shipping traffic through the Strait of Sicily, which is a valuable economic activity in the area. The ecosystems of the Strait of Sicily have been substantially modified through fishing from early times, and the presence of aquaculture facilities add complexity to the burden of factors facilitating invasion by alien species. Summing up these factors it can be readily envisaged that the rate of biological invasions will increase in the area in upcoming years. It is generally the rule that few of them will persist, even fewer will have negative effects for nature conservation and the economic sustainability of fisheries, and more rarely some could have some positive effects.

The energy consumption pattern in the Strait of Sicily, and more generally in Europe, is changing rapidly after the accident of the nuclear power plant of Fukushima in Japan. The public opinion is exercising considerable pressure to block nuclear energy in European countries. This is likely to prompt renovated interest in non-nuclear sources of energy. It can be reasonably assured that “green” and “unconventional” sources of energy, which are both abundant and cheap, will dramatically increase in most European countries with little or no access to other sources of energy. On one hand, Italy and Malta are both densely populated and surrounded by seas, were wind-mill farms raise little concern among citizens and do not suffer from the curtailing effect of land-masses. On the other hand, substantial shale-locked hydrocarbon deposits located in the continental shelfs and shelf-edges of the central Mediterranean attracted the attention of oil companies. It is hence probable that the maritime territory will be subjected to space claim from energy companies to place off-shore wind-mill farms as well as oil and gas exploitation platforms. These activities directly impact the marine environment, raising conflicts with conservation and fishing, affected by the loss of rare or unique natural features and fishing grounds, respectively. In addition, wind-mill farms, as well as oil and gas platforms act as stepping stones facilitating the dispersion of alien species.

The main impact of oil exploration is the production of high levels of noise by shooting air-compressed guns. The intensity and frequency of this acoustic contamination has a negative effect in marine mammals. It is less clear the impact of such noise on fishes, for which dissimilar results are reported in scientific literature. It seems probably that the effect of seismic shooting on fishes depends on the focused species. During the drilling phase, the resulting mud can release toxic substances as heavy metals. During the platform operation, diffuse oil spillages are known to occur. Diffuse oil spillage is the main source of oil contamination in the sea. The local landscape is also disrupted. Bottom structures are left onto the bottom after use and obsolete platforms are commonly sunk. Apart from conservation issues, conflicts could arise because the naturalness of the area decreases and any other activity is not allowed within the close neighbourhood of the wells.

Projects for wind-mill farms in the Strait of Sicily contemplate the direct anchorage of generators to the rocky bottom of the off-shore banks. This is in conflict with conservation efforts, since off-shore banks communities are both exclusive and fragile. In some instances, banks hold the last remains of relict Mediterranean communities in a near-pristine status that is impossible to find in any other place. In addition, banks are of main importance for the sustainability of many fished populations due to their role in the oceanography of spawning and nursery grounds. Moreover, the artificial structures would facilitate sport fishing by concentrating fishes (FAD effect) and allowing easy localization of the banks. Off-shore MPAs covering some

off-shore banks and the area around Malta have been proposed by international organizations as well as identified (albeit not implemented) in fisheries management plans.

Therefore the marine environment can be expected to degrade as the result of impacting energy exploitation and enhanced invasion by exotic species. Since these are promoted by economic activities of strategic importance for the involved countries, it would be unrealistic to expect any significant change by further regulating the activities themselves.

Two alternative scenarios were developed that, rather than being mutually exclusive, represent two possible extremes in policy vision and management approach. Scenarios were focused on nature conservation and fishery sustainability under climate warming and the developing energy industry. Alternatives are given priority to wind-generated energy (S1) or the exploitation of fossil fuels (S2).

Select the scenarios to be presented and list them in table 7.2. Scenarios should then be developed by identifying the:

- Costs (e.g. expenditure, time, effort (one of the factors determining efficiency))
- Actors (bearing the costs)
- Benefits (often expressed in money terms; can also be public's willingness to pay to obtain the impacts of an intervention; something that promotes or enhances well-being; an advantage)
- Beneficiaries of the alternative scenario

The points above can be described qualitatively and presented in table 7.2. Alternatively, a formal socio-economic analysis (SEA) could be undertaken to provide information about the benefits and costs of a range of implemented and/or suggested measures. The most commonly used forms of SEA are Cost-benefit analysis (CBA), Cost-effectiveness analysis (CEA) and Multi-criteria analysis (MCA). More information on these analyses is detailed in Appendix 2.

Table 7.2.

Present policy: nature conservation and fisheries sustainability	Costs	Actors (bearing the costs)	Benefits	Beneficiaries
Alternative scenario 1: development of wind-mill farms	Lost of biodiversity hot-spots, potential lost of unique habitats and locally important sources of spawners of target species.	Actual society and future generations (in terms of lost of unique biodiversity hot-spots), professional fishermen depending of the target species supported by large local spawners.	Renewable clean energy with little environmental impact beyond the place of deployment of wind-mills.	Actual society and future generations.
Alternative scenario 2: Exploiation of fossil fuels	Contraction of fishing grounds for trawlers.	Actual fisheries (trawlers) and future	Long standing but limited cheap and dirty	Actual society.

		genreations (in terms of decreased environmental quality through diffuse contamination and increased emission of green-house gases).	energy, reduced dependence on the inestable traditional oil and gas suplies.	

For each scenario, include a short piece of text to describe each scenario. Since different consequences result from different policy alternatives; the consequences (or the expected effects) should be compared.

Finally, any potential conflicts (for each scenario) should be identified and reported. Write a short summary of these points for each alternative scenario.

Where there is no local or regional information about future changes, consider mean global future changes or drivers such as climate change.

Having placed the most important adaptive management needs in logical groupings (table 7.2 scenarios), the next action is to work out, very approximately at this stage, what the connection is between them. What does each group of needs represent? It is advisable to have two complementary scenarios. The reason for this is that it helps managers to avoid 'choosing' just one, 'preferred', scenario - and lapsing into single-track forecasting (negating the benefits of using 'alternative' scenarios to allow for alternative, uncertain futures). This can be challenging where managers are used to looking for opposites; a good and a bad scenario, or an optimistic one versus a pessimistic one. Preferably the two scenarios are required to be equally likely, and between them cover all the possibilities. Ideally they should not be obvious opposites, which might once again bias their acceptance by users, so the choice of 'neutral' titles is important.

TEXT DESCRIPTION OF THE POSSIBLE SCENARIOS

(S1) If wind-generated energy are substantially promoted, e.g. through the implementation of appropriate policies, off-shore banks will face a serious environmental impact derived from the physical occupation of their biological communities down to 20-35 m depth in order to place the towers onto the bottom. In addition, water circulation will change around the towers as a result of their physical presence. It is unclear the type of effects that the altered circulation pattern could have on the local communities, since these are unknown for rocky and coralligenous communities. These impacts can be expected to be relatively limited in extent (that of the banks) and chronic.

The physical occupation of banks by mills would delete little fishing grounds to the industrial fishery, mainly represented by trawlers. However, it would make banks very easy to locate by sport fishermen that, with the aid of technology like eco-sounders and vertical jigging, could easily deplete large, “relictic” spawners of fishes targeted by industrial fisheries. Such large individuals could both inhabit the banks (e.g. groupers) or being attracted by the vertical profile of the bank and the associated water mixing (e.g. amberjacks). The impact of such selective deletion is unknown because the reproductive potential of individuals inhabiting the banks should be large yet unknown. Indirect evidence like the reports of few professional and sport fishermen operating around banks and shipwrecks suggest that such impact could be substantial. Finally, it is actually unknown what type of impact could have the generators’ magnetic fields on species highly sensible to magnetic cues, like turtles and sharks.

Invasion by exotic species would be enhanced by providing new surfaces for colonizing organisms. In addition a new type of "habitat" would be present since mills also provide very shallow substrates currently lacking in the banks.

In the absence of appropriate initiatives, the resulting output is a substantial risk of erosion of the local biodiversity through alteration of the pristine communities, loss of the spawning potential of local sub-populations potentially important in sustaining the exploited stocks and deterioration of fragile habitats and their associated communities.

A possible initiative to hamper biodiversity loss could be the implementation of several small MPAs to protect the particular environments represented by the off-shore banks. This would be analogous to the small protected areas around shipwrecks already implemented in Malta. Wind-mill farms could be placed over less sensitive areas, perhaps utilizing existing technologies that allow to fix the mills onto platforms under the sea level, which in turn can be anchored at great depths over more homogeneous and extensive bottom types.

(S2) If unconventional hydrocarbon exploitation is promoted, a different scenario can be depicted. Exploration has negative impacts in some organisms, notably marine mammals. Since low frequency sound travels very long distances in the water, the acoustic contamination is expected to cover a vast area. Oil exploitation also has large, diffuse impacts over wide areas through small but continuous leaking of toxic compounds from the facilities. Although a massive spill is possible, the probability of such an even is very low. The impact of diffuse leaking is by far the most important source of hydrocarbon contamination in the sea. Sediments resulted from drilling operations can also release heavy metals and other toxic substances. In addition, facilities and wells takes space from fishing grounds to the industrial fishery. The resulting picture is a large diffuse impact that conflicts with the sustainability of the local fishery. In the short term acoustic exploration could affect some exploited stocks. In the long term contaminants leaking from facilities could enter the food web and reach the targets of the fishery.

Invasion by exotic species would be promoted by the presence of large facilities over a vast area, acting as stepping stones for species that would find difficult to disperse over large distances in the open sea.

In the absence of appropriate initiatives, the resulting output is a negative effect on the sustainability of industrial fishery through the contraction of fishing grounds, the decrease of the quality (either real or in terms of image) of the marketed products and the increased risk of wide ecological changes.

The implementation of few large MPAs, extending into the high sea, would preserve important species from human impacts and ensure some ecosystem goods and services. In the short term this could imply additional losses of fishing grounds for trawlers. In the long term, biological productivity and sustainability of fisheries would be enhanced in the remaining exploited areas. It is however difficult or impossible to avoid the effects of diffuse contamination, particularly through trophic webs. In addition, it is currently unclear if "frozen" concessions could be activated after a MPA would be in place. In fact, legislation prohibits hydrocarbon exploitation at less than 3 (previously 15) nm from any MPA, but it is not defined what happens if the concession for hydrocarbon exploitation was previous to the implementation of the MPA.

While the reduction of fishing capacity is a fundamental objective in the study area, it should be accompanied by actions towards the increase of the market value of fishing products. The last is specially important for the sustainability of the fishery industry, constrained to reduce fishing effort and thus the total catch. In this perspective, the creation of protected areas to conserve and enhance the environmental quality of the area could provide an added value to the local fishing products if correctly managed. There is some evidence that the adoption of "eco-labels" certificating environmental protection, local origin and sustainable exploitation practices provides higher market prices to the sold products.

CONNECTION BETWEEN BOTH SCENARIOS

The main conflicting point in both scenarios is between conservation and the supply of energy. Conservation is in turn connected to the sustainability of fisheries. The alternative scenarios depict two probable ways for increasing the availability of energy sources. As presently stated, both scenarios identify the local environment

(hence the local society) and the fishery industry as losers. Although traditionally opposite, conservation and fishery needs are on the same side in the face of the strong drivers represented by the effects of climate change and the market energy demand. Conservation and fisheries meets in their effort toward sustainability of economic activities in the ecosystem. Such effort is large since most stocks suffer from a generalized state of overfishing. However, the type of costs, the time scale and the feasibility of specific actions to counterbalance deleterious effects is different between the two scenarios.

Green energy development provokes local environmental impacts that can be largely mitigated by thoughtful allocation of the areas where to place generators. The deleterious effects on fisheries sustainability could be curtailed by limiting the access to wind-mill farms and supporting regulations with proper enforcement. High selective, low impacting artisanal techniques could be allowed under proper regulation and control, providing a way to sustain fisheries and to preserve their associated cultural heritage. The increased risk of deleterious biological invasions is relatively smaller than that associated with the alternative second scenario, since the volume and spread of new substrates would be more limited in the first scenario. The benefits for the local society would be long-standing and would mostly benefit future generations.

Exploitation of fossil fuels prompts diffuse environmental impacts difficult to hamper. The extent of those impacts is potentially the whole Strait of Sicily since ecological processes are connected through oceanographic features operating at the scale of the entire area. The sustainability of fisheries is negatively affected by the reduction of fishing grounds and the possible decrease of the market price of fishing products from deteriorated environments. The implementation of large MPAs to counterbalance these effects is costly (because they would subtract large portions of fishing grounds) and difficult to implement (since largely allocated beyond national jurisdictions). The risk of biological invasions giving rise to ecological and economic problems is higher than in the previous scenario. On the positive side, it must be kept in mind that the strategic interest for fossil fuels is high, since energy supply is a fundamental aspect for economic development and traditional fuel suppliers are expensive and politically unstable. The benefits for the local society are thus immediate albeit limited in time, through increased availability of valuable, cheap, contaminant energy sources. Long-standing negative effects would be mostly beard by future generations in terms of deteriorated environmental quality and accelerated climate change.

Action 7.3 Recommend improvements in management strategies

Select the preferred alternative policy scenario(s) from table 7.2 above. Each scenario can be used to identify and select management measures.

Information collected in steps 5 and 6 and the governance analysis will help to complete this action. Table 7.3.1 shows the information that is needed and where some of it can be found in the manual or in the respective section of the Governance Analytical Structure. Please note that whilst information can be sourced from the Governance Analysis, it is important to remember this information stems from the analysis of one priority objective, which is defined in the Governance Analytical Structure as 'the objective on which the governance analysis is focused, recognising that this should also be a key priority in the existing initiative you are evaluating'. Since the MESMA WP2 framework is designed to enable assessment of multiple operational objectives, any recommendations for improvements to management (in action 7.3) should be made with respect to multiple operational objectives and not just the priority operational objective selected for analysis in the Governance Analytical Structure.

Table 7.3.1

Input	Source
The level of success of operational objectives	Table 5.2
Gaps which indicate that objectives are not met	Tables 5.1.2 – 5.1.3
Were indicators appropriate for assessment?	Table 5.3
How failure is explained	Report from step 6.2

Effectiveness of different governance approaches	Section 4, Governance Analytical Structure considers effectiveness of different governance approaches in achieving the priority objective
Equity, knowledge, power and other related concerns for governance	Governance analysis – discusses equity, knowledge, power and other related concerns for governance raised by the priority objective
Balance and difference between local and high level objectives	Governance analysis - discusses validity of priority objective from some different perspectives

Using this information, the output of steps 5 and 6 are essential input for the identification and proposition of management improvements. In addition the outcome of the governance analysis gives us relevant information for formulating recommendations in management, monitoring and/or participation strategies. If we have some idea of 'dominance or orientation' of institutions in a SMA then we may be able to formulate recommendations for improvement, if management, monitoring and/or participation strategies prove to be ineffective.

To make recommendations for an improved strategy, it may help to answer, as far as possible, the questions detailed in table 7.3.2, using the information sources signposted in table 7.3.1.

Table 7.3.2

Question	Answer
Which institutions are 'dominant' in the SMA, based on the described and analysed institutional landscape?	The national government, through the ministries for the economic development and the environment, dominates the management of national waters through a top-down approach based on regulations.
What management improvements are needed, management strategy, monitoring strategy, participation strategy, or a combination?	Bottom-up participative management, giving voice and decisional capacity to local authorities and stakeholders, is urgently needed if the necessary measures should be accepted by the local society. This type of approach is being recently implemented through the creation of local management authorities for fisheries (CoGePa). It is needed to enlarge the approach to a multi-sector stakeholder spectrum. Subsequently, a shared and transparent management strategy with clear targets regularly monitored should be negotiated and adopted.
What choices must be made in improving management, monitoring strategy – or both – given the described and analysed institutional landscape?	(1) To improve scientific evidence; (2) to make information widely available; (3) to improve coordination among overlapping (and sometimes conflicting) authorities; (4) to support actions through effective enforcement; (5) to provide early stakeholder engagement; and (6) to enhance transparency of the management process.
Which adjustments must be made in objectives to implement the new management strategy	Objectives for nature conservation should be better defined, providing specific targets and deadlines. Objectives for fisheries sustainability should include specific references to the preservation of the cultural heritage held by fishermen.
How can the adjusted objectives be balanced between local and EU policy frameworks and their objectives?	Local policy frameworks are usually produced without public participation. Moreover, the lack of information promotes public unawareness of the importance of the objectives. Therefore, local policies objectives are defined under the pressure of a public opinion that is contrary to further impositions because unaware of the necessity of the actions and the importance of the high level policy goals. Proper information and participation are therefore essential. While participation is currently being

	improved through the creation of local management authorities for fisheries, information is still lacking.
Which adjustments must be made in indicators to implement the new monitoring strategy?	A more frequent monitoring and evaluation of indicators is needed in fisheries management plans. Management plans and the related indicators are still lacking for conservation initiatives.
How can the adjusted indicators be balanced with indicators in EU-policy frameworks?	Through ensuring that the inspiring principles of EU policies is preserved and properly conveyed through the process ending in the local implementation.
Which adjustments must be made in the involvement of stakeholders to implement the new participation strategy?	Stakeholders should be called to give their perceptions and needs early in the management cycle, instead of being passive sufferers of the already finished management plans produced without their direct implication.
What are the institutions that need to be changed or developed to support the implementation of the recommended strategies?	The actual institutions should be linked and harmonised transversally in order to be more effective. Local governance institutions need to be developed in order to balance the current top-down management approach with a bottom-up counterpart. Institution endorsed with enforcement responsibilities are numerous, overlapping and generally inefficient.
What are the implications for policy development and reform at the EU level?	EU policies are already oriented to the public participation in the management and should continue in that direction. However, it is important to realize that, in order to be effective, public participation must objectively and unbiased informed. Otherwise, the local societies became wept out by strong stakeholders that monopolize the decision-making procedure. It is an error to assume that ideas that appear clear to EU policy-makers will be so when translated in a different context with very different traditions and cultural models. Without the proper awareness and vision, misinformed public obstacles management. Conversely, local societies will not accept regulations exclusively made of prohibitions.
How can the adjusted involvement of stakeholders be balanced with the (required) stakeholder involvement in EU-policy frameworks?	Stakeholders are currently called to passively observe the output of a quite opaque decision-making process. The successful implementation of EU policies calls for the (1) unbiased information of the public; (2) early engagement of stakeholders; and (3)

	actions in support of local societies.
What does the improved overall strategy – management, monitoring and participation – look like and how can it be monitored and evaluated?	An improved overall strategy passes through an unified management plan, which is currently lacking. In such a plan, information availability to the public, early participation of stakeholders and transparency through the management process are essential. In addition, due to the large area covered by the high sea and the functional interconnections at large spatial scales, the participative engagement of countries on the African coast of the Strait of Sicily (Tunisia and Libya) should be of great importance.

Finally, use the answers in table 7.3.2 to fill out table 7.3.3 to conclude on suggested improvements to management, monitoring and participation strategy through adjusted objectives, indicators and stakeholder involvement. Where necessary, refer to information in the governance analysis.

Table 7.3.3

Alternative scenario:		
Improvements in...	Changes in...	What are the changes...?
Management strategy	Natural objectives	Define operational objectives
	Human objectives	Define operational objectives to preserve the cultural heritage of the fishery sector
Monitoring strategy	Natural indicators	Define baselines, targets, monitoring programs and deadlines
	Human indicators	Define the time basis for monitoring and evaluation
Governance	Institutions and governance approaches	Governance institutions should be transversally linked and harmonised. Bottom-up governance approaches should be promoted.
Participation strategy	Intensity and diversity of stakeholder involvement	Information of the public society is an essential pre-requisite. Wide stakeholder involvement should be promoted at early stages of the management cycle.
Combination of management, monitoring or participation strategy	Mixed adjustments	Coordination among different management bodies and transparency in the management process must be greatly enhanced.

Action 7.4 Internal orientation: reality check for improvement in management measures

Action 7.4 demands a reality check of the suggestions for improved management; an evaluation of the adequacy of your new objectives and suggested improvements. Ask the question 'are the improvements realistic?' This will also be considered through the governance analysis and more specifically section 5.2 of the Governance Analytical Structure.

ARE THE IMPROVEMENT REALISTIC?

Local policy is aimed to short-termed objectives have been often perceived as a mix of impositions for most people and subsides for few ones. Such approach has promoted the pursuit of personal interest, opposite to the responsibility of bearing efforts for attaining collective benefits. Improvements in information, participation and transparency will realistically promote the social acceptance of and identification with the management system, thus facilitating the implementation of the policies.

Objectives inspired or related to the CFP were to be met by 2013 and later extended to 2015. Yet there is evidence to suspect that some or many objectives will be not matched by that date despite any improvement.

Objectives related to the marine Strategy Framework Directive and the new EU Biodiversity Strategy are ambitious. Although the 2020 deadline appears far away, there is little time for reaching the targets. One of the main difficulties is the lack of sound scientific knowledge about the status of the Strait of Sicily and the intensity of the pressures exerted by human activities in the area. Uncertainty is therefore high.

Action 7.5 External orientation: Relation with the EU policy framework

In order to make sure that an alternative policy scenario is in line with the relevant EU policy framework, it has to be checked against relevant policies. Some policies of general importance at EU level are the Marine Strategy Framework Directive, Water Framework Directive, Common Fisheries Policy and the Habitats Directive. Relevant regional, national and local policies should also be taken into consideration.

- Identify relevant policies using information from step 1b and other available or new sources and list them in the table 7.5 below.

The EU relevant policies were the Common Fisheries Policy, the Marine Strategy Framework Directive as well as the Habitats and Birds Directives. In addition, the EU 2020 Biodiversity Strategy and the upcoming EU Strategy on Invasive Alien Species, which is of main importance in the study area and into the context of climate change. The Water Framework Directive, while being relevant, was not taken into consideration given the small fraction of coastal waters in the Strait of Sicily. Regarding conservation, the most important Italian framework is the Act 979. For fisheries, the EU reformed Common Fisheries Policy was implemented into the Italian National Operative Plan and the Strategic Operative Program.

- Fill in new operational objectives and management measures (according to recommendations from table 7.3.3) in the checklist and describe the links between each new aspect and policy.

Derived objectives were synthesized from an ample array of operational objectives found in the many sectoral management plans. Derived objectives were stated highlighting their alignment to the inspiring principles of the reference policies.

New D1: Substantial reduction (80%) and rationale spatial allocation of fishing effort by 2015.

New D2: Financial viability and safe working conditions for fishery workers by 2015.

New D3: Nature conservation, environmental protection and substantial reduction (20%) of loss of specific biodiversity components by 2020.

New D4: Sustainable exploitation of fish stocks by 2025.

New D5: Promotion of selective and sustainable practices in artisanal fisheries by 2015.

- Check whether the new operational objectives and management measures are in line with relevant policies or not. If not, explain why and fill in the changes that have to be made.

In the absence of an integrated management plan, operational objectives were derived from a wide range of sectoral management plans, as well as policies and laws of application in Italy. In doing so, such objectives were already quite in line with the relevant policies at European and national levels.

Table 7.5.

New operational objective and management measure from alternative policy scenario	Relevant policy (numbers link to tables 1b.1 and 1b.2 for relevant policies and laws)	Level (EU, regional, national or local)	Describe link of new aspect to relevant policy.	Check if new aspect is in line with relevant policy. If not, explain changes that have to be made.
New D1: Substantial reduction (80%) and rationale spatial allocation of fishing effort by 2015	1, 2, 3, 4, 5, 6, 7, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 92, 106, 108, 110, 111c, 116, 116b, 118, 145, 181, 189b, 195, 200, 200b, 201, 212, 235, 236	Global, regional, European, national and local	Reduction and rationalization of fishing effort	In line
New D2: Financial viability and safe working conditions for fishery workers by 2015	1, 2, 3, 4, 5, 7, 63, 97, 134, 104, 106, 108, 111, 111c, 112, 112b, 113, 118, 122b, 127, 133, 138b, 138c, 140b, 145, 147c, 181, 182, 183, 188c, 189, 200, 200b, 201, 212, 212, 224, 229, 229b, 235, 236	European, regional, national and local	Healthy working conditions for crews. Adequate incomes for fishermen and economic viability of fisheries	In line
New D3: Nature conservation, environmental	60, 61, 63, 63, 66, 67, 68, 69, 70, 84, 85, 86,	Global, regional, European, national and local	Conservation of relevant habitats and species,	In line

protection and substantial reduction (20%) of loss of specific biodiversity components by 2020	86b, 87, 89, 90, 91, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103a, 103b, 104, 105, 107, 109, 109b, 111b, 111c, 114, 115b, 115d, 117, 119, 121, 122, 122b, 123, 125, 125b, 125c, 129, 130, 131, 132b, 134, 134c, 134d, 134e, 134f, 137c, 137d, 137e, 138, 138b, 138c, 138c, 138c, 138c, 140, 140b, 141, 141b, 142, 142b, 142c, 143, 143, 143b, 144, 144b, 146, 147, 147b, 147c, 149, 150, 151, 152, 153, 154, 155, 156, 158, 159, 160, 161, 162, 163, 164, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 182, 183, 184, 185, 186, 187, 188, 190, 191, 193, 194, 196, 197, 198, 199, 202, 203, 204, 205, 206, 208, 210, 213, 214, 217, 219, 220, 221, 222, 223, 225, 226, 227, 228, 231, 232, 239		environmental protection, ecosystem restoration, prevention of spread of (usually exotic) harmful organisms	
New D4: Sustainable exploitation of fish stocks by 2025	2, 3, 4, 5, 7, 66, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 89, 91, 92, 93, 96, 97, 102, 103b, 104, 105, 106, 108, 109, 109b, 111c,	Global, regional, European, national and local	Sustainable exploitation of stocks	In line

	115a, 116, 116b, 117, 118, 120, 122, 123, 124, 126, 127, 133, 134b, 134c, 134f, 135, 136, 137, 137f, 137e, 138b, 138c, 139, 145, 148, 149, 157, 166, 168, 179, 180, 181, 182, 183, 185c, 185d, 185e, 188b, 191b, 193b, 195, , 198, 200, 200b, 201, 207, 209, 212, 212, 215, 216, 218, 229, 234, 235, 236			
New D5: Promotion of selective and sustainable practices in artisanal fisheries by 2015	101, 150, 183, 188c	Regional, European, national and local	Conservation of cultural values	In line
New D6: Simplification, coordination and harmonization of governance	Reformed Common Fisheries Policy, 192	European and national	Representation and negotiation, shared decisional power	Partially in line but significant achievements are still lacking
New D7: Enhancement of the legitimacy of local management	High level policies	National and local	Essential for the social acceptance of any management initiative	In line but unfitted to the local realm. There is a strong cultural opposition to transparency in local administrations and citizens are generally diffident about administrative bodies

Action 7.6 Write a report on adaptive management needs for the SMA

Depending on whether a spatial management plan is in place or not, this action will create a report on adaptations of an existing management plan or write recommendations for a new management plan. Using the results from the actions 7.1 – 7.5, write a report including:

- Identified desired future condition.
- Chosen policy scenario (from 7.2). The preferred scenario should consider the long-term policy objectives.
- Prioritized recommendations (from 7.3).
- A timeline with actions and a description of development stages.

The report should be written in a clear language with clear recommendations following the template below.

Report on adaptive management needs for the Strait of Sicily
Results from application of generic MESMA framework

SMA Strait of Sicily, Central Mediterranean
Author Tomás Vega Fernández
Institution CNR-IAMC
Date 13/09/2011

Current state of spatial management in SMA (to be used as a checklist):

- Recommendations for a new management plan.

There are a wide range of sectoral plans, further divided by segments (e.g. type of fishing gear) and geographical sub-area (GSAs 10, 12, 13, 15 and 16). This, in addition to the heterogeneity of legal (territorial and international waters) and administrative bodies (Italy and Malta) make management of the area very inefficient. This is because the spatial scale and extent of the ecological processes supporting the resources that are intended to be managed are larger than that of any of the current management plans or initiatives. Since an unified management plan of the whole Strait of Sicily is a highly desired, yet very ambitious goal, it is rather unfeasible and recommendations for enhancing the current management regimes are also provided below.

- Recommendations for adaptations of the existing management plans.

NOTE: The following recommendations do not take into account the new management plans for the Sicilian SCIs, appeared September 2012.

Definition of habitats and species that deserve protection in the Strait of Sicily, for example through the adoption of the RAC-SPA set of criteria for the Mediterranean region.

Definition of a regular environment monitoring program, e.g. onto annual or seasonal bases, to establish the baselines of the habitats and species identified.

Definition of specific actions, targets and deadlines in line with the temporal duration of the reference policies (2013 for the CFP; 2020 for the MSFD as well as the EU Biodiversity Policy).

Specific measures aimed to guarantee that governance institutions become simplified, linked and harmonised, e.g. through transversal information sharing, in order to enhance coordination.

Specific measures to ensure transparency, e.g. by providing ample publicity to decisional processes, regular reporting of the progress that should become rapidly and easily accessible by public.

Specific measures warranting the legitimacy of local management through the promotion of bottom-up governance approaches. The mechanism is to raise public awareness of the importance and necessity of management goals. Specific actions could include the provision of unbiased information and the engagement of a wide spectrum of stakeholders, giving them active roles since early stages of decision-making processes.

The effective implementation, establishment and enforcement of the zoning scheme already stated in the current management plans must be undertake in order to achieve the declared objectives of reduced fisheries induced mortality of stocks.

- If there are no existing gaps or drawbacks in current management, no recommendations are needed. Current management will be continued.

Report on the results from actions 7.1 – 7.5:

- Identified desired future condition.

The desiderated status in that of healthy, productive ecosystems able to support a wide array of human uses and economic activities in a sustainable way. The Strait of Sicily is already a very productive system in the Mediterranean context, due to unique oceanographic features. The ecological status is good albeit not pristine in most of the area. Sustainability of industrial fisheries is not feasible as many stocks are already overfished and conservation efforts have to be undertaken in order to preserve ecosystems structure and function in the face of new drivers. The natural and cultural heritages are huge but largely neglected.

- Description of the preferred policy scenario (choose from table 7.2), it should consider the long-term policy objectives.

The scenario promoting wind energy exploitation is to be preferred over the one based on the exploitation of fossil fuel deposits because it was found to be in line with long-term objectives of reference policies like the Marine Strategy Framework Directive and the 2020 Biodiversity Policy. Moreover, the exploitation of aeolian energy creates less conflicts with other important sectors like fisheries and tourism. Conflicting issues with conservation needs can be hampered through an effective zoning scheme and the use of alternative technologies. It is important to stress that, in the short term, exploitation of fossil fuels is more appealing under different points of view. For example the economic income is probably higher, the power to produce energy is larger giving rise to strategic importance, and environmental concerns are not readily detectable in the short term.

- Prioritized recommendations for improvements in management strategies (from action 7.3, new assessments, new decisions, and/or new implementation).

Large scale, effective policies to change the current patterns of energy use are essential to attain sustainability. Such policies are lacking or ineffective in the Strait of Sicily.

Communication and coordination among the numerous administrative bodies is needed in order to avoid overlapping of competences and contrasting measures.

It is urgently needed to pass from imposed restrictive regulations to participative management plans. To achieve such a shift, enhanced governance structures are urgently needed. They would hamper the override of decision-making processes by particularly strong stakeholders. Early involvement of stakeholders and open access to unbiased information are essential to promote transparency and provide legitimacy to the decision-making process, which in turn would facilitate the acceptance of the management measures.

Rational re-allocation of human activities within a zoning scheme would greatly improve the integrity of ecosystems as well as the sustainability of human activities.

Regarding conservation, dedicated management plans are generally lacking. The only exception are some local management initiatives in Malta (ICZM, MPAs, partial or total restrictions of fishing activities) and the new (September 2012) management plans of the Sicilian SCIs. Taking all together they represent a extremely tiny fraction of the study area and are clearly insufficient.

Regarding fisheries, a contraction of the fishing effort is needed in order to ensure sustainability of the stocks. However, other measures like zoning schemes should be carried into effect. To provide economic sustainability, the market price of fish products must be raised. This can be achieved through the adoption of "eco-labels" certifying low impact and sustainability of the fishery procedures, which appear in current management plans but have never been carried out. Even trawl fishing, which is by far the more impacting fishing activity in the area, could be made more "green" e.g. by adopting devices to lower by-catches and modifying gears to made them more selective.

Scientific knowledge need to be improved and regular monitoring programs must be implemented to make possible the evaluation of the trends regarding the attainment of the management objectives.

- Evaluation of the level of implementation of EBM, by relation of the objectives to the criteria of EBM.

The practical implementation of EB principles is largely absent in the Strait of Sicily. Importantly, the necessary conditions for EBM (e.g. public awareness and acceptance) are even lacking in many cases. Malta has already started ICZM initiatives, which places this country in a better position to implement EBM with respect to Italy in the area.

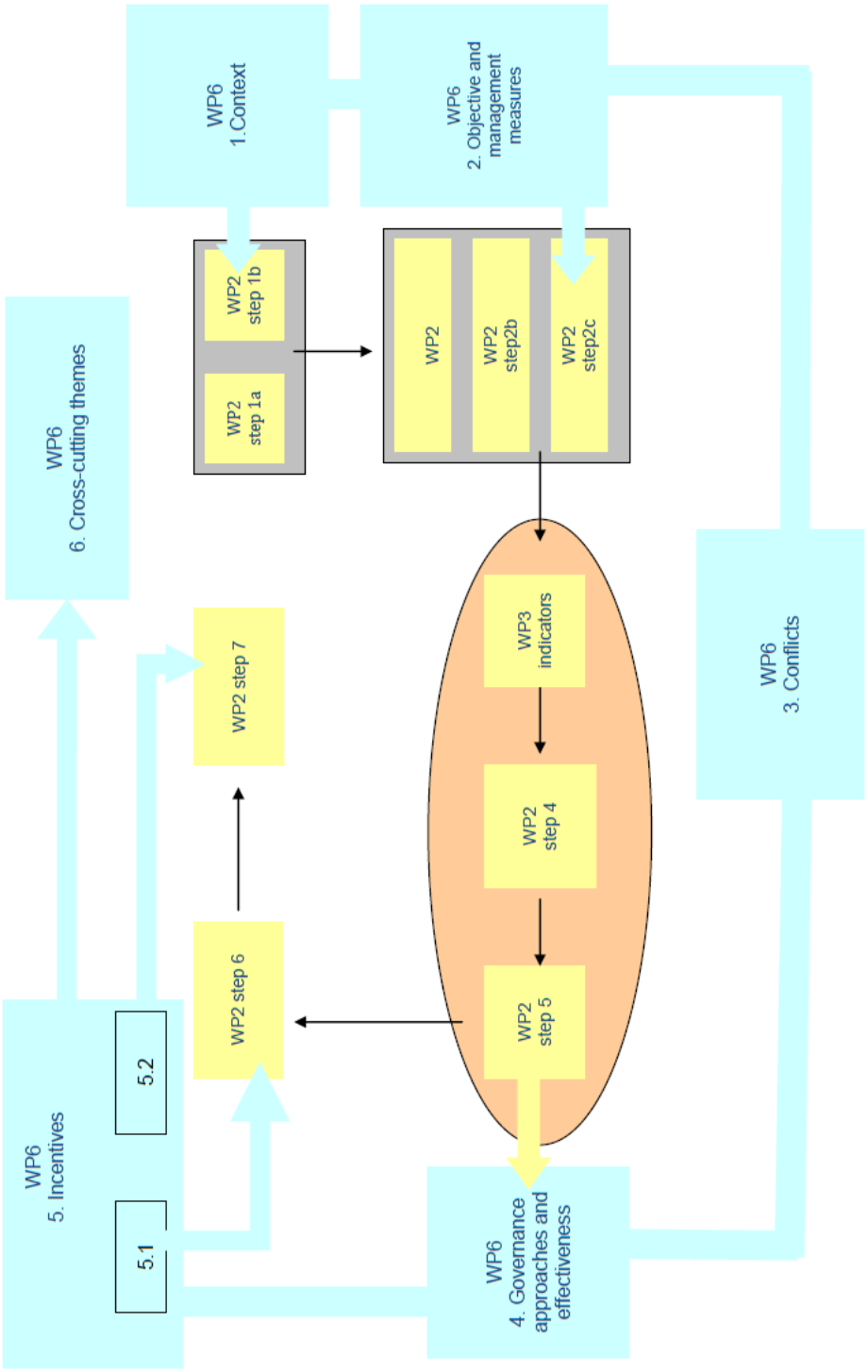
It is worth of note that the Strait of Sicily is a unified and dynamical system at the oceanographic mesoscale. This peculiarity make necessary the involvement of non EU coastal countries in the area in order to get EBM. At least Italy, Malta, Tunisia and Libya should agree in the identification of a common view on the management of the Strait of Sicily, as well as the definition of common guidelines and the coordination of management actions oriented to EBM.

- Timeline with actions and a description of development stages.

2013: Definition of a policy vision shared among all the actors involved across the whole area. Practical (on the field) implementation and enforcement of ample zoning schemes. Practical implementation of monitoring programs and harmonization among them.
2015: Responsible management plans for nature conservation, environmental protection and biodiversity preservation. Achievement of the necessary reduction of fishing effort. Widespread extension of the zoning schemes.
2020: Achievement of the environmental and biodiversity preservation targets. Stable protection of at least 20% of the area. All uses in the area are compatible with the high level goals stated in the 2013 vision.
2025: Fish stocks start to rebuild after 10 years of effective protection and effective management. Sustainable management of fisheries stocks. Economic viability of the fishery sector.
2050: Near pristine communities develop in protected areas after 30 years of effective protection.

Appendix 1 – Links between WP6 and WP2

These linkages are contingent on WP2 and WP6 sharing the same operational/priority objective.



APPENDIX 2 – SOCIO-ECONOMIC ANALYSIS

Socio-economic analysis is a method to clarify and highlight all the important consequences of an action before a decision on implementation is made. It can be used in the evaluation of different measures, ranging from small projects to projects with big budget effects and reforms.

Socio-economic analysis provides information about the benefits and costs of a range of measures, which in turn, provides a basis for ranking of and prioritization between alternative actions. Increased use of such analyses is an important prerequisite for more efficient use of resources.

The most commonly used forms of SEA are:

1. Cost-benefit analysis (CBA)
    - Provides a framework for comparing the costs and benefits of a proposal (as they would be measured in economic resource or opportunity cost terms).
    - Qualitative or quantitative.
    - Aims to determine if a proposal is worthwhile from a social perspective.
2. Cost-effectiveness analysis (CEA)
    - Assesses proposed environmental measures.
    - Can be used to determine the most cost-effective means of achieving pre-set targets or goals, which are often defined by governmental guidelines or legislation.
    - Provides evidence with respect to the cost-effectiveness of a given measure (without the use of any pre-set goals).
    - Helps the regulator to compare a range of measures, with respect to the level of benefits achievable at a given level of cost.
3. Multi-criteria analysis (MCA)
    - Semi-quantitative or qualitative.
    - Techniques range from checklists to trend analysis, to intricate mathematical procedures.
    - Converts the potential impacts of a proposed measure into a common unit of measurement to allow direct comparison of the measure's critical elements.

There are six main steps associated with performing a socio-economic analysis:

1. Describe the problem and objective
2. Specify the measures
3. Describe and assess the impacts
4. Calculate the economic profitability
5. Highlight the uncertainty

6. Give an overall assessment and make recommendations

GLOSSARY OF TERMS

Term	Definition
Actor	People from wider society, non-governmental organisations, user groups, regulatory agencies, corporate interests, *etc.* who interact with each other in governance processes.
Arc Marine	Arc Marine is a geo-database model tailored specifically for the marine GIS community.
Benchmark	A numerical value that gives a measure of the performance of a computer product in a specific test.
Characteristics	"… Member States shall … determine, for the marine waters, a set of characteristics for good environmental status, on the basis of the qualitative descriptors listed …"
Criteria	"distinctive technical features that are closely linked to qualitative descriptors".
Criteria and methodological standards	“to ensure consistency and to allow for comparison between marine regions or sub-regions of the extent to which good environmental status is being achieved.”
Data integration	Data integration involves combining data residing in different sources and providing users with a unified view of these data.
Data quality	Indications of the degree to which data satisfies stated or implied needs. This includes information about lineage, completeness, currency, logical consistency and accuracy of the data.
Descriptors	Qualitative descriptors for determining good environmental status : 1) Biological diversity, 2) Non-indigenous species, 3) Commercial fish, 4) Foodwebs, 5) Eutrophication, 6) Sea floor integrity, 7) Hydrography, 8) Contaminants, 9) Contaminants in food, 10) Marine litter, 11) Energy including noise.
EcoQOs (Ecological Quality Objectives)	“can take the form of targets (values where there is a commitment to attain them), limits (values where there is a commitment to avoid breaching them) or indicators (values which highlight a change in the ecosystem and can trigger research to explain what is happening).”
Ecosystem approach	A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

Ecosystem approach to management	The Ecosystem Approach to Marine Management involves an integrated management of human activities based on knowledge of ecosystem dynamics to achieve sustainability of ecosystem goods and services and maintenance of ecosystem integrity.
Ecosystem Based Management	Ecosystem based management is an environmental management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation.
Ecosystem Based Marine Spatial Management	Ecosystem based marine spatial management (EB-MSM) is an approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation.
End user committee	A committee consisting of a representative range of stakeholders.
Environmental Target	"a qualitative or quantitative statement on the desired condition of the different components of, and pressures and impacts on, marine waters in respect of each marine region or sub-region."
Feature	A feature is an abstraction of a real world phenomenon. A geographic feature is a feature associated with a location relative to the Earth.
Geographic Information System (GIS)	A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps.
GIS Web Service	GIS Web services are a constantly emerging technology that allows many divers Web based applications to interact in order to exchange geospatial data and GIS software.
Goal	Purpose, aim, or the anticipated result which guides action.
Good Environmental Status	"the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations."

Governance	The involvement of a wide range of institutions and actors in the production of policy outcomes….. involving coordination through networks and partnerships. Or Steering human behaviour through combinations of people, state and market incentives in order to achieve strategic objectives.
Governance approach	A style of governing involving a particular combination of incentives, and/or a particular allocation of authority and responsibilities between different actors, e.g. communities, governments and business corporations.
Governance analysis	Qualitative research to explore different perspectives amongst different stakeholders on the validity, legitimacy and effectiveness of different governance approaches for achieving strategic objectives through MSP in the context of specific case studies, employing a standard set of themes.
Indicator	Progress in relation to operational objectives will be measured using indicators and associated reference points and directions. An indicator is a measure, or a collection of measures, that describes the condition of an ecosystem or one of its critical components; in socio-economic objectives, indicators can be a desired outcome, f.ex. the amount of kilowatt produced by a wind park.
Incentive	Particular SMA institutions that are instrumentally designed to encourage people to choose to behave in a manner that provides for certain policy outcomes, particularly conflict management & ecosystem restoration, to be fulfilled.
INSPIRE	Infrastructure for Spatial Information in Europe.
INSPIRE Directive	The INSPIRE directive aims to create a European Union (EU) spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe.
INSPIRE Portal	a geoportal provide the means to search for spatial data sets and spatial data services, and subject to access restrictions, view and download spatial data sets from the EU Member States within the framework of the Infrastructure for Spatial Information in the European Community (INSPIRE) Directive.

Institution	Very broad term covering a wide range of agreements, interactions, etc., which remain relatively stable or predictable over a certain period of time, including: Mutually agreed modes of cooperative behaviour (norms), Interactions through markets: local – distant, Government policies and programmes and Legal instruments and related obligations.
Interoperability	The ability of two or more autonomous, heterogeneous, distributed digital entities (e.g. system, applications, procedures, registries, services or data set) to communicate and interact or be used together despite their differences in language, context, format or content. These entities should be able to interact with one another in meaningful ways without special effort by the user, the data producer or consumer, be it human or machine.
ISO 19115	ISO 19115 "Geographic Information – Metadata" is a standard of the International Organization for Standardization. It defines the schema required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data.
ISO 19119	ISO 19119 “Service” is a standard of the International Organization for Standardization. It identifies and defines of the architecture patterns for service interfaces used for geographic information and definition of the relationships to the Open Environment mode, presents a geographic services taxonomy and a list of example geographic services placed in the services taxonomy. It also prescribes how to create a platform-neutral service specification, how to derive conformant platform-specific service specifications, and provides guidelines for the selection and specification of geographic services from both platform-neutral and platform-specific perspectives.
ISO 19139	ISO-19139 “Geographic information - Metadata - XML schema implementation” is a standard of the International Organization for Standardization. It provides a XML implementation of ISO-19115 metadata standard.
Layer	A logical separation of mapped data usually representing a theme, such as roads, political boundaries, etc. Layers are all registered to one another by means of a common coordinate system.

Marine Protected Area (MPA)	Any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.
Marine Spatial Planning (MSP)	Marine spatial planning (MSP) is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process.
Management initiative	TO BE COMPLETED
Management measures	TO BE COMPLETED
Metadata	Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information.
MSFD	The Marine Strategy Framework Directive (MSFD) is a high level document and requires further development and specification ('operationalisation') before it can be applied to specific regions.
Operational objective	A short-term goal, defining a clear, often measurable, outcome of a process (SMART objectives).
Pressure	Human pressures exerted by human activities.
Priority Objective	The objective on which the WP6 governance analysis is focused, recognising that this should also be a key priority in the existing initiative you are evaluating.
Protected area	A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Protocol	A set of semantic and syntactic rules that determine the behavior of entities that interact.
Replacement cost	Replacement cost and variants such as relocation cost (sometimes called shadow project) are based on the concept that the cost of replacement of a damaged environment is somehow a measure of the value of that environment.

Sea use management	Sea use management promotes sustainable development (based on achieving a balance of environmental, socio and economic objectives), uses a strategic, integrated and forward-looking framework, applies an ecosystem-approach to management, identifies and safeguards important components of marine ecosystems and uses MSP to minimise conflicts on the use of space.
Spatially Managed Areas/SMA	Areas where a marine spatial planning framework is in place or is being developed in order to conserve structure, function and processes of the constituent marine ecosystems through the management of the cumulative pressures of different sectoral activities inside or outside the area concerned, and including the threats posed by climate change and geohazards.
Spatial Management Plan/SMP	TO BE COMPLETED
Stakeholder	Stakeholders relevant to the MESMA project are divided into the following categories:
Stakeholder (operational)	Operational stakeholders: groups whose core activities and economic performance is closely related to exploiting or using marine resources or marine areas, i.e. engaged in or related to fishing, mariculture, marine renewables, aggregates, oil/gas, etc. industries;
Stakeholder (indirect)	Indirect stakeholders: members of the public who passively interact, e.g. through aesthetic appreciation, with the marine area in question or have an indirect stake in it (hold existence values, bequest values, etc.);
Stakeholder (policy)	Policy stakeholders: responsible authorities or bodies who have to put forward the legal framework and policies related to strategic objectives for marine areas, e.g. national governments, EC, international bodies;
Stakeholder (regulatory)	Regulatory stakeholders: bodies or agencies that manage marine or coastal areas, e.g. management bodies of MPAs, fisheries regulatory and enforcement authorities;
Stakeholder (science & advocacy)	Science & advocacy stakeholders: engaged in research and/or advocacy, e.g. environmental NGOs, universities.
Synergistic institution	An institution that is conducive to or supportive of the achievement of a particular goal/objective.

Web-based GIS or WebGIS	Web-based GIS (Web-based geographic information system or simply WebGIS) is a distributed geographic information system across a computer network to integrate, disseminate and communicate geographic data visually on the Web. Web-based GIS refers to use of Internet technologies to distribute and delivery geospatial information in a variety of forms, including maps, images, datasets, spatial analysis operations and reports.
Water Framework Directive (WFD)	Water Framework Directive (WFD) entered into force in December 2000. The WFD is a legislative framework that rationalises and updates existing water legislation by setting common EU wide objectives for water (inland surface waters, transitional waters, coastal waters and groundwater) and introduces an integrated and coordinated approach to water management in Europe.
XML	Extensible Markup Language (XML) is a W3C-recommended general-purpose markup used for describing many different kinds of data.